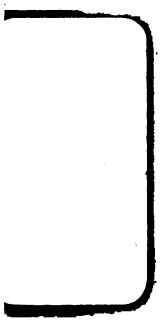

L. L. Jennings
917 Caldwell Av.
N. Y. City.

Yours faithfully
Charles Wesley Emerson.

PHYSICAL

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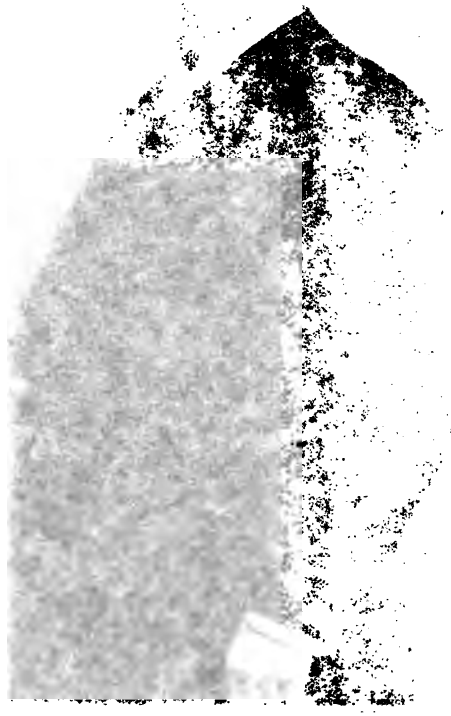

PHYSICAL CULTURE

OF THE

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PREFACE.

THE origin of this book is as follows. During the past few years the author has given public lectures upon a system of physical culture arranged by himself and consisting of exercises, many of which he originated, while others were adapted from suggestions received from other systems. By means of this system, together with voice culture, the writer restored himself to health at a time when he had become a confirmed dyspeptic and was a victim of consumption in an incipient stage, and by means of this system he has since developed a most abundant vitality and great muscular power. The system became a part of the curriculum of the Monroe, now the Emerson College of Oratory, where it has been the means of restoring the sick to health, and of harmonious bodily education for the strong.

The public lectures upon this system of physical culture and the original principles underlying it, have been received with a degree of favor that has en-

couraged the author to yield to the requests of students and alumni that the thoughts suggested in the lectures be placed in a more permanent form. The writer has striven to present the system in a teachable form, to avoid technical phraseology so far as may be, and, at the same time, to present a work which shall be suggestive rather than exhaustive.

The exercises herein described and illustrated, constituting the original system of physical culture of the Emerson College of Oratory, are now being taught by graduates of this institution in universities, colleges, state normal and high schools in all parts of the United States and in Canada.

C.W.E.

PHYSICAL CULTURE.

PHYSIOLOGICAL AND PSYCHOLOGICAL LAWS TO BE OBEYED IN BODILY EDUCATION.

"Know ye not that your body is the temple of the Holy Ghost . . . therefore glorify God in your body." — I. Cor. vi., 19-20.

ONE of the encouraging signs of these times is that people are coming to recognize that there is no virtue in being sick. The time has been when life was considered unholy, but vitality is as precious in the sight of God as is intelligence. Soundness of brain depends upon soundness of body. There is no such thing as a sound mind in an unsound body. The unsoundness of mind may not be very apparent, but it is actual. The test of the health of the body is happy sensation continuous. We are responsible to God for our bodies.

The appearance of men and women as we see them on the street, in the counting-room, and in the parlor, as well as the testimony brought in from every source

in regard to public schools, and the time allowed for physical exercises therein, are sufficient to show us that, as a nation, we have little conception of what physical education requires. It is astonishing, in view of the past, and in view of the future, that men do not see that, in a republican government, we must depend upon the strength and the power of the men and the women who carry it forward,— that nothing is attained without the rounding of the whole man. I scarcely need refer to the Greeks, and yet, so far as education is concerned, they have been the despair of all succeeding ages. We have had in no other age schools to be compared in results with the Greek schools. Nowhere else has there been such personal education. What did they lay as the basis? Physical culture. In that is the secret of their success. Greece has given us representative men in every department. We point to Greece for the greatest orator, for the greatest creative poet, for the greatest sculptor, for the first man in what we consider the highest mental philosophy. Plato intellectually stands at the head of all the philosophers of the world. We must remember, then, that that which made the Greeks what they were about four or five hundred years before Christ, was the natural evolution from physical culture.

For nearly two thousand years the subject of

physical education lay dormant. The modern gymnasium has revived it. The enthusiasm for bodily training thus created, will be of inestimable value, for, as a public, we are lethargic upon this all-important subject.

In setting forth and describing in some detail, exercises, many of which are original with me, and all of which are practised according to principles that have not heretofore entered prominently into the theory and practice of other instructors in physical education, I write in no spirit of criticism of systems or methods. I recognize no antagonism. A great bank of darkness envelops the world. Every true teacher is a torch-bearer, advancing into that darkness. We cannot add to the general illumination of the world by extinguishing the torches of others.

No great artist ever spent his time in criticism of other artists. Michael Angelo was once asked to criticise some of Raffael's frescoing. He said nothing, but he took a crayon and drew a figure — the best he could, and then replied: "I criticise by example." Michael Angelo emphasized a gospel principle. Criticise your neighbor by example; by living better, if you can. As much of truth as is in your work will be immortal; the rest you do not wish should live. Mendelssohn once said: "I do not want to hear so much criticism of music.

I want the critic to compose some music." But I may say a word in a fraternal spirit to the effect that I believe there is something good in nearly every system of physical culture. I never felt like discouraging any. All teachers and students of physical culture, if they but understood these spiritual fraternities, would consider themselves brothers and sisters, and not be ready to say, "My system is all right, and yours is all wrong."

Let us say in the new light, "Come, let us reason together." Let us openly contribute all we may; for when we are advocating any system of culture, be it mental or physical, it is the welfare of the race that is involved.

In presenting exercises which, in the principles involved, and in the arrangement and in the methods of practice constitute a unique system of bodily education, I shall speak, first, of results. The true test of the merit of a method is its *results*. Now, ten years of experience, ten years of watching effects has shown that the results of practising this method of physical culture are simply wonderful, more marvellous than I should like even to state. I can only allude in passing to the great cures that have been wrought in those who have followed it faithfully, — to the many who have been restored from dyspepsia, from

lung troubles, from nervous prostration, from general debility.

The Emerson College system of physical culture comprises about three hundred movements. Some of these movements are repetitions. These are not a great number of movements, when we consider that some systems advertise several thousands.. One of the merits of having as few movements as possible is, that one may be allowed to repeat, for *it is in repetition that good comes in any method of education.* The one great fault of modern systems of education is, that they do not provide sufficiently for repetition. I say "modern" — I might say American, but it would not be true of America only. It is a fault which is as common in European methods of education as it is in American methods. There are leading scholars in Germany, who, as individuals, follow out the old classic idea of repetition as a method of culture, to a greater extent, perhaps, than do eminent American scholars. But the prevailing tendency is to dissipation ; for desultory study leads to dissipation of thought and thought power.

"By dividing his time among too many objects, a man of genius often becomes diamond dust instead of a diamond. Many a person misses of being a great man by splitting into two middling ones." We must never lose sight of the educational value of con-

centration and repetition. One of the things that are held up as commendations of some systems of physical culture, I look upon as a serious objection to them, namely, the very great variety which they advertise. In such systems there can be but little chance for repetition. It is said "the child wants something new; it does not want to go over the same thing. It loses heart; it loses interest; and we must have a system which will command the interest of the child, because we are looking not merely to the restoration of adults, but to the improvement of children, and so we must have novelty in all forms of education." Let this be the novelty — *seeing something new in the old.* When the feeling is fresh the story is new! Why do we all rise up and declare for the Greeks? Why do we give them the laurel, as the best educated people that ever graced the earth? We do not pretend — no one will pretend — to attain to the level of the Greeks; circumstances will not admit of it. Men try to find reasons for Greek superiority in nationality, and in the times in which they lived. The reason is, simply, that educators have not so arranged our different studies as to make suitable provision for repetition. It is repetition that develops power in the body. Hence, my object has been, while formulating a method of physical culture, to have just as few exercises as possible and

reach the results, so that we may have a chance to repeat those exercises. Each exercise is so arranged as to attain the sum of the results of several exercises. According to observations, it will take a close student about four years of daily study and practice to attain perfection in execution of the movements required by the system. One need not divide it up and say, "I will stay so long on one part, and I will stay so long on another;" but if he practises faithfully, in a reasonable length of time valuable results will appear in his person; for increasing health and beauty will continue to reward his perseverance. His endurance of hardship and fatigue will be correspondingly augmented. This system of physical culture provides always for an ideal; therefore, there is no such thing as reaching the end, because the exercises are in their nature without limitation. Something better can be done each day as long as they are practised; that is, they are ever leading out and leading onward rather than coming to any point of limitation. There is always the possibility of education toward something beyond what we have attained.

This system of exercises is entirely unique — entirely unlike as a system and in its methods, any other in the world. Be it a right one or a wrong one, it stands upon its own merits, and not upon the merits

of any other system. There is no one particular cardinal point in it that is like, as a principle, anything which is in any other system. One will often see exercises that have some resemblance to these, but our exercises are taken with reference to a principle entirely unlike the principle in reference to which other systems of exercises are practised. I do not say this to praise these exercises — that alone does not prove whether they are good or bad. I simply say they are unlike others.

The system of physical culture, which we are to discuss, aims, in the first place, at *the highest condition of health and beauty, through such exercises as are authorized and required by the laws of the human economy.* We cannot impose an exercise upon the human body. If we give an exercise, that exercise must be required by the laws of the physical economy. It is not a thing of accident. The body is under the dominion of law: that law requires that there should be exercise of a definite kind. The primary object sought in obedience to these requirements, is *vital supply for the entire organism.* By this I mean the practice of those exercises which help the body to obtain nourishment from the food given to it — from the nutrition provided. This end is accomplished, first, by *securing the proper position of the vital organs.* No exercises

should be taken until the organs are given their proper position. Any exercise taken when the vital organs are not in a proper position is harmful to those organs. The normal positions of the vital organs are secured by the proper contractions of the muscles that sustain these organs. The greater the altitude of the vital organs, other things being equal, the greater is their vigor. The heart beats with a more perfect rhythm when lifted high in the chest than when it is low. When the vital organs are high, the lungs consume more air, the stomach properly secretes gastric juice, the liver secretes bile from the blood, the alimentary canal is healthy in the production of what are called the peristaltic waves. The moment these vital organs are lowered from their normal altitude, that moment their tone of power is lowered. There is no physical defect so general as this, — that the vital organs are from one to four inches too low among adults, and among children down to the age of five or six years. Before this time the vital organs are high.

As to the consequences, all physiologists will agree that no vital organ below its normal altitude can perform its functions properly. It is a requirement and a provision of our method of physical culture that these vital organs should be kept in position. This *lifting of the organs* does not necessarily consist in throwing the

chest out. The lungs are not on the outside; they are in the trunk of the body, and, as they are lifted, the shoulders are thrown apart and the back is broadened as much as the chest is expanded. Too much is said about "holding the shoulders back," as if they were given us to put behind us. The shoulders belong on the sides, and in raising the lungs it is not necessary to throw the shoulders back. To bend the back and bulge the front of the body is to sacrifice the back to a protuberance in front. It is an injury to the lungs, and especially an injury to the stomach. I have known more cases than I have recorded, of persons cured of dyspepsia by muscular exercise. But the first step in effecting such a cure was to lift the vital organs sufficiently high in the body, for I have never known a case of chronic dyspepsia where the stomach was as high as it ought to be while, at the same time, the person had proper nourishment. A clergyman came to me the other day saying that he had dyspepsia, — which some believe to be a "semi-clerical disease." The stomach proved to be two and one-half inches below its normal altitude. I told him that if he could bring the stomach up to its proper position, and his parish did not starve him with a small salary, he might become healthy and rotund.

Dr. S. S. Fitch invented machines for sustaining the

vital organs, but their effect was disappointing. But the Creator of the body has given man a machine, without money and without price. Man must be taught to use it. These facts, gathering in my mind, have resulted in this conclusion: that there is no such thing as a chronic disease of any vital organ, so long as that organ maintains its normal altitude. If there is such a case, I have yet to find it, and I have examined many hundreds of persons in regard to that one point.

The next method by which the vital organs are developed is, by *exercising the muscles that surround the vital organs.* The organs themselves do not possess voluntary muscles, nor are they connected directly with voluntary muscles; but they are surrounded and held in place by voluntary muscles. These muscles exercise over those organs a certain quickening power. It may be asked how this can be, when these muscles are not connected directly with the vital organs. The muscles have a certain mechanical effect; they bring a definite mechanical pressure to bear upon the organs. The muscles that surround the body are not to rest, but were destined to activity, from birth to death. It is a curious fact of observation, that the muscles around and over the vital organs, though not attached directly to any, — and the separation is clear-cut, —

seem to be so related to the vital organs that one can judge of the condition of a vital organ by the muscles over it. For example, one can judge of the condition of the stomach by the condition of the muscles over it. A physiologist would not need to ask a man how his food agreed with him if he could examine the muscles over the stomach. A person with chronic dyspepsia cannot bear a touch upon the muscles over the stomach. If he happens to meet a blundering June bug he collapses. Why is this so? My opinion is that the nerve centres which rule the vital organs are affected, through reflex action, by those nerve centres which govern the muscles surrounding the vital organs. Some muscles are controlled by the same nerves that control the organ under them. Those muscles that hold the organs in place, create such activity in the pneumogastric nerve that it carries life and animation to the stomach and liver. I know not how else to account for this observable fact. I saw it first recorded by Dr. Jackson, thirty years ago, as a record of his long experience with dyspeptic patients and those who had what they called "liver complaint."

Moreover, the muscles that hold the stomach in place, constitute a portion of the muscles of respiration; therefore, if a person breathes only in the upper part of

the chest, he does not exercise what is below the lungs. Deep, full breathing, exercises the muscles around the waist and exercises the abdomen. The contents of the abdomen are thus moved, and their energy is quickened. I am aware, in saying this, that certain works on physiology, declare that men and women ought to breathe differently; that, while men should take a full and deep respiration, women should not; that woman is not constituted so that she should, especially after the years of puberty. Yet, if we look at the muscles of respiration, we find that they are precisely alike in men and women, and the stomach and the liver need the same motions in both sexes in order to promote the activity of these organs.

Now, the third method by which these vital organs are developed is by *preserving a due balance between the energy that supplies and the energy that wastes.* There are certain muscles of the body that quicken the supply of blood, — that develop the power of life. It is blood that we want, — it is blood for which every part of the organism is crying out. Nourishment, nourishment, nourishment! Where is the nourishment? In the blood. What manufactures the blood? The vital organs. Look well to them. From them radiates all power. The vital organs are the manufacturers of life. Now, a certain number of muscles are used perpetually

in quickening the activity of the vital organs. There are other sets of muscles that are used continually in wasting the supply that comes from these vital organs. Now, this latter class of muscles may be developed until they will exhaust the blood and kill the person; as in the case of the wonderful Dr. Winship, who developed such muscular power that he could lift two thousand seven hundred pounds, but died of prostration. He lost the balance between the two functions. A man is truly strong, in proportion as he is strong in the vital centres. Here is the factory manufacturing blood, and that factory is kept up to its normal tone by exercising the muscles around its organs. Inasmuch as there is another set of muscles constantly using up and exhausting the blood, we must preserve due balance between the two sets. *We must strengthen the centres while we free the surfaces.* If the demand of the muscles that waste, exceeds the vital supply, no matter how strong the muscles are, the health is going down. Strength of muscle is not health. We must, then, have a system of physical culture that aims directly at the vital organs: first, and second, and all the way through. It is the testimony of physicians that over ninety per cent of diseases are caused by derangement of the stomach and liver. Hence the importance of strengthening

those organs. Our exercises spur the inactive liver to perform its functions, and they stimulate the process of digestion in the stomach, causing the gastric juice to flow more freely. They preserve the balance between the muscles that supply and the muscles that waste. By properly combining the exercises of the muscles of the neck, arms, and legs with those of the torso, we preserve due balance between the energy that supplies and the energy that wastes. In all the exercises that we give for the arms and legs, the muscles that surround the vital organs are more powerfully exercised than are the arms, neck, and legs themselves. The exercises are, in fact, so arranged as to affect immediately the vital organs.

In the second place, we maintain in our exercises the *equilibrium between the forces of the pneumogastric and the sympathetic nerves, on the one hand, and the forces of the spinal cord and spinal nerves on the other.* I have spoken of the muscles. Let us now consider what are the nerves that develop life — that maintain and quicken the vital organs in enabling them to fulfil their functions. They are the pneumogastric and sympathetic nerves. By their force and activity, the whole manufactory of vital force is maintained.

The nerves propel and regulate the activity of all the vital organs. The reason too much labor breaks

down the constitution and destroys life, is that the equilibrium between waste and supply is destroyed. It is impossible to determine just how much manual labor the body may be subjected to without detriment, because it is not the amount of labor which injures, but the unequal supply. Nature governs by opposing forms of force. In the movements of the planet there is the centrifugal force, that would send the planet forward on a straight line, and there is the opposing form of force, which curves the line of its movement. So in the human system there is one form of force that is constantly wasting life, and another form of force that is constantly producing it. Health and life are perpetuated by the equal manifestations of opposing forms of force.

There are two kinds of exercise which affect the nerves, strengthing and disciplining them: one is mental and the other muscular. Not that, strictly speaking, there are some muscles which waste, and other muscles which supply life; but *harmonious* exercise promotes the activity of the life-making organs, while inharmonius exercise exhausts. Harmony of action is a law of life, and therefore there should be provision in physical exercises for developing harmony between all the groups of muscles. I have said that there must be a balance between the activities of the pneumogastric

and sympathetic nerves, on the one hand, and the activities of the spinal cord and nerves on the other. Now, what is the office of the spinal cord and nerves? From the spinal cord comes power to move the hands and feet — motor force. Every time I move my arm, the tissues are calling for blood in the ratio of the waste, but this process is not manufacturing blood. I move my legs; I spread them far apart; I bring them together; I run and leap; I hang upon a pole; I balance myself across the pole; I pull at the rings; I lift chest weights; — all these processes are carried on by the strength of the spinal cord and the spinal nerves, and exhaust the fluids of life. No harm is done by this if, on the other hand, we develop equal energy in the pneumogastric and sympathetic nerves. But there is great danger in going through all these severe exercises unless we have some counter exercises to supply an equivalent to the waste. Now, what we want in physical exercises, and what the Emerson College system provides for, is the preservation of proper balance between these two forces, so that, while one is exercising the spinal cord and nerves, he is, by the same exercises, calling upon the pneumogastric and the sympathetic nerves to supply the nutriment exhausted by the use of the opposing nerves.

Again, we must *preserve this true balance between the*

exercise and stimulation of the life-sustaining forces and that of the brain. In schools we work the brains of children to their utmost capacity, that they may learn and recite certain lessons. But the value of acquirement is in its use. It is not altogether the knowledge a man possesses that gives him power, although knowledge is said to be power. The question is, what can the man do with his knowledge? Has he added to his brain power by study? Yes, provided that he makes blood enough for that brain, otherwise he has not added to the sum total of his power. He may know how to solve a problem in geometry, but the knowledge of the solution of that problem may not have added anything to his personal power, unless he has sufficient blood to sustain the brain he is using while he is trying to discipline it by means of these lessons. The fundamental life-sustaining parts of the great nerve system must be nourished, before activity of the accessory portions is greatly taxed, or we shall have brain forcing and vital decline. We must secure *permanence in exercise*, and for this the exercises of the Emerson College provide in their very nature. Physical culture should continue through life. One cannot lay up a store-house of health during five years to draw on for the next fifty years. He should be developed by a system of physical exercises that he

can repeat every day, no matter where or how he is situated. Our system requires no apparatus; it calls for no room especially prepared for exercises; it makes no further demands for a special costume than that the clothing worn during exercise, must be loose and free. It needs neither clubs, rings, weights, dumb-bells, parallel bars, nor any of the things to be found in a well-furnished gymnasium. I am not an antagonist of these things. They are doing good in their place and time, but we cannot carry gymnasiums about with us. We are to develop the healthy man before we try to train him to be a Hercules. We want free gymnastics to which we can devote a few minutes every day and under all conditions, for it is the continuance of exercise that gives it value.

Another object sought by our exercises as a means to health and beauty is, to *free the different parts of the physical system that are joined by definite articulations, and thus prevent them from embarrassing each other.* The greater the number of articulations, the more complete the gracefulness, other things being equal. The serpent is the most graceful of animals because of the number and freedom of his articulations. If the articulations of the human body are free, the person moves in curves, and there is also repose of bearing. As soon as any articulation becomes rigid, the parts

which that articulation joins embarrass each other in their movements, and hence produce friction and waste. For example, the articulations that are in the neck are often partially rigid, — there is a lack of freedom. This is especially manifest in advancing age. The consequence is that the head on the one part, and the chest and back on the other, interfere with each other's movements and are dead weights upon each other, requiring a great deal more strength to move than would be necessary if the articulations were free. But the exercise that frees the articulation must be exact, and must be in accordance with the structure of the articulation itself. It is not every exercise that will develop an articulation. We must study that articulation, find its physiological nature, and adapt our exercises to it. We should secure the freedom that prevents one part from embarrassing another, (*a*) *by giving the exact exercises to each articulation which are demanded by its physiological structure;* (*b*) *by giving such exercises to each articulated part as will cause it to act in harmony with all the other articulated parts of the body.* Not only must these articulations themselves be free, but there must be established or developed a harmonious movement between the different parts that are joined by these articulations. This harmony always exists naturally, but needs education. The action of the

muscles assists the arteries in the distribution of blood throughout the system; therefore there can be no constriction of any muscle without embarrassing the heart's action, though not always to an appreciable degree.

The third object sought is economy of force, or, in other words, *a maximum of result with a minimum of effort.* How much force is unnecessarily expended by a person whose physique is uncultivated! He is every day expending the force of two or three men to do the work of one. The Greek could so move that, with a minimum of force, he could attain gigantic results. It is this that made him the best soldier in the world, when he would fight. Cæsar himself was a copyist of the Greeks in this respect; during forty years he spared no pains in cultivating his body to the last possible degree, and that practice gave him his great agility. He could labor many hours more than any other man, because there was so little friction in the body. This high physical condition is attained, first, by practising *such attitudes of the person as are in harmony with the law of gravitation, thereby overcoming the resistance of the weight of any part.* One can never step out of the hand of gravitation; it is working for him or against him all the time. If he works with it, it works for him with an infinite power; if he works against it, it crushes him

as if it were an iron hand of fate. An important end sought and attained by a faithful practice of our exercises is the securing of proper poise or oneness with this universal law. Poising brings perfect obedience to the law of gravitation, secures infinite reinforcement, and a suggestion of power and self-command. All physical powers seem controlled in the grasp of the sovereign will. Poise stands for strength. Weakness takes a braced and constrained attitude. Poise is a gymnastic of the nervous system; it strengthens the cerebellum. Poise gives presence and secures ease. There is no rigidity in the cultivated body. If it moves, its movements will be soft as music.

Again, we must *develop due relationship between different groups of muscles.* Now, here come the most delicate of all the exercises in physical culture, — those which require the most careful attention, and, in all probability, bring the highest results. Our muscles are not all snarled together, as they might appear to be, to the novice examining them. Different groups of muscles bear a certain relation to each other. The muscles of the arm and neck are so related that if the arm is raised the muscles of the neck are affected. In this we have an illustration of reflex action, that law of the body by which the exercise of certain muscles causes other muscles in physiological

relationship with them to move also; for there is a natural reflex action from muscular sense, as well as from the stimulation applied by experimenters in vivisection. If the neck be held rigid, normal response through the law of reflex action has been prevented, and an undue exercise has been given to the muscles of the neck. Such an exercise a child would never use at its play. In nearly all muscular exercises that are taught, there is indication of a lack of knowledge on this subject of the relation which the muscles sustain to each other. The true object is not to see how much exercise a person can take; it is to secure accurate, physiological and educational exercise.

Nearly all the muscles act in groups. Thus, in the universe, nature gives a system by itself, but it relates that system to other systems. It was once thought that outside of our solar system there was no other system of planets. Now we believe that the number of systems is countless as the fixed stars. But there is a proper relationship existing in the universe between these different solar or planetary systems. If that relationship should cease for the millionth part of a second, the consequence would be the destruction of our planetary system throughout. But that relationship is secure; in our bodies it is not so. There is a separate group of muscles that governs the

arm, but that group acts in relation to another group, and that to yet another. Now there is a delicate relationship between those different groups; and that relationship must be developed through the securing of proper reflex action, or there is inharmony in the body, great friction, great wear of parts. It is just as if, in a watch, two wheels were held so near together as to hinder each other; the watch would go wrong because of that friction. So it is when different groups of muscles do not act in harmony with each other, — when the relationship between them is not properly developed and obeyed. Development of this relationship, prevents undue waste of muscular tissue. One may say: "Does not physiology teach that we must waste the tissues?" Certainly, but outside of certain limits one must not go.

Development of this relationship of the muscles prevents undue nervous tension. Now, when no proper relationship exists between two contiguous groups of muscles, there is a nervous tension exerted unduly, upon both groups, causing the one group to hold itself stiffly in resistance to the other, and making it necessary for the second group to overcome the resistance of the first.

Our next object is beauty. The Greek sculptors have shown us what God meant physically when he created

man. Beauty and health cannot be divorced. That which produces health produces beauty; that which produces beauty will produce health. I wish to make the claim emphatic, that beauty is one of the objects sought by our system of physical culture, because that which I claim as one of the chief excellencies of this system, is the very thing that some people say is its fault. Let us examine this ground. One of the most important functions of muscular exercise, is to assist the arterial system. The heart, unaided, cannot perform all the work of carrying the blood through the system. The heart is assisted by the arteries, and they are prompted to healthy exercise by the effect produced upon them by the muscles when in action. The arteries can be assisted by any muscular exercise. Any form of exercise is better than no form at all, but I believe those motions the most helpful, which are at the same time the most beautiful. All nature's lines are curved lines. The curved line is the line of beauty. All our exercises are in curved lines. I believe that a curved movement assists more than an angular one or one that is made in a straight line. There seems to be a prevalent belief that the uglier the exercise the more beneficial it is. That aspect reminds me of what a man said once in an audience. He called my attention to some one who was present,

and said: "There is a good man." "How do you know?" I said, "are you acquainted with him?" "No," he replied, "but he is so ugly he must be good." It seems as if this notion prevailed in matters of physical culture. It is sometimes so ugly that it must be good. Why can a movement not be beautiful and helpful at the same time? Every physiological law thus far discovered points to indissoluble union of use and beauty. Every physiological reason favors it. The movements of the Greeks were beautiful, and no other nation ever cultivated the physique as they did. Other things being equal, the slower the movement for most exercises, the greater the result! Notice the feeble man. If he is compelled to make a movement, he does it with a jerk. He cannot raise his arm slowly and steadily at the same time. There is a jerk in his walk. These jerks indicate his weakness. If you see a man full of jerks, physically, you always believe there is something physically weak in the man. Jerks, then, are a sign of weakness.

And yet what we claim to be one of the excellencies of our system is said to be a fault! I appeal to common-sense; — is beauty a fault? The druggist finds even the counterfeit of beauty in great demand. Like everything else, the markets have tried to monopolize beauty, and, for a few cents, one may buy something to

make her look exceedingly handsome, with ruby lips and rosy cheeks. Ah, but go to the fountain, and drink! Nature asks no money. God has a way of developing beauty outside of the druggist's shop. When one can make the world believe that beauty is not a valuable thing, he has reached the extent of deception, for that will be the greatest of all. Would one like to live in a world devoid of beauty? Whenever our system of physical culture has been exhibited, there have always been physical culture critics present, who said they liked it very well, all but one thing, — it was "too beautiful." We *intend* it shall be beautiful. Ugly exercises never developed beauty, and they never developed the true perfection of health.

What does beauty include? It includes, first, unity. *Without unity there is no beauty.* Some people have said that beauty is only skin deep. There never was a greater mistake. Beauty is more than skin deep. If one will tell me how deep soul depths are, I will tell him how deep beauty is. The beautiful face and the beautiful form have been developed down the ages from beautiful impulses of the soul. There is not a handsome face in the world to-day, that does not owe its inheritance to beautiful impulses that existed in the bosoms of its ancestors. There may be beautiful

faces to-day which are masks for evil thoughts; there may be beautiful faces which, instead of being the façades of temples of worship, are the façades of dens of thieves; but let these evil conditions continue, and the face slowly but surely loses its charms. Something gave that fine outline of brow, and chiselled nose, and sweet mouth. Something, we know not when nor where, but it existed in the hearts of the predecessors of the person who owns the face. From ugliness comes ugliness. From beauty of soul, by-and-by, down the ages somewhere, comes beauty of face and beauty of form. Beauty is a sign that there is good somewhere. When is a face really beautiful? Why, when each feature, and the parts of each feature, are in harmony with each other. What gives beautiful expression? Unity of expression. When the expression of all parts of the face combine in one common unity, then we have positive beauty of expression; and it was from beauty of expression that beauty of the features was developed, somewhere and at some time. There never was a beautiful effect without a beautiful cause. Men do not gather grapes from thistles. Men do not drink sweet water from a bitter fountain. Plato says: "Are not goodness and beauty somewhat?" What is unity? *The whole expressed in each of the parts.* Unity is the criterion of beauty. Art

delights, only in the ratio that the law of unity is obeyed. In the Greek statue there is a line of continuity throughout each part, associating it with every other part, so that all confirm each. In the best of the Greek statues the spirit which the artist intended to reveal is manifested in every part of the figure, so that each part repeats what every other part expresses. The more perfect the unity, the more perfect the illusion of life, until the beholder is moved to say: "That statue speaks!" Our physical exercises obey the law of unity. Our system is the only one that even pretends to obey this law. There is no other system of exercises, — there is no form of manual labor that educates all muscles harmoniously. We keep before us the whole man. Every part must be exercised in reference to the whole. The gymnasium works with parts. We work with parts in vital relation to the whole. When a part moves, other parts must respond harmoniously. Hundreds of bones and muscles are to be moved by a single impulse, to one purpose. We aim to produce perfect action of the parts in relation to the whole.

We aim for beauty, then, because it includes so much. It includes, first, unity; second, it includes power; third, it insures endurance, because in unity of action there is little friction. Therefore a person

whose movements are beautiful can move without fatigue much longer than a person whose movements are ugly. If one wants to rob a person of his power of endurance let him teach him to move in an ugly manner. Look at pictures of ugly exercises which appear as bad as the pictures of some of the victims on the rack during the Spanish inquisition, — (for some of these pictures do much resemble them), — then ask, Can beauty come out of such exercises? Why can it not? Because we know that a beautiful movement is a movement that is free from friction, — a movement in which all the powers of the body are united as one by the realizing of a common purpose.

Finally, beauty involves self-command, which is shown in this harmony of the parts. Of what value is a mighty arm — of what value a front like Mars, if one cannot use them, if one cannot make the powers of body assist each other to the realizing of a common aim? We claim that these exercises not only develop beauty of movement, but also that they develop beauty of form. They do not develop great tumor-like bunches of muscles in one part, and cause great depressions or impoverishment of the tissues in other parts. There is, on the contrary, harmony in and between all the parts from centre to periphery.

These different exercises, again, follow each other in such consecutive order as to secure obedience to the physiological law which can be phrased thus: *from rest to climax, from climax to repose.* Exercises should be begun gently. The utmost power should be put forth at the middle of the exercises, and the latter part be less strong. One should never start suddenly in exercise. What is the record in regard to animals? How many horses have fallen dead when suddenly started from a walk! Again, how many have fallen dead when suddenly stopped at the height of speed! The same facts are true of men. About two years ago a gentleman ran to catch a train; he caught the train, stopped, and dropped dead. It was not the running that killed him; it was not the vigor of the exercise; it was the sudden stopping that killed him. We lay stress upon three directions for exercises, viz., *slowness, precision and definite aim.* This system is constituted of exercises that are related to each other, and inhere in the principle that governs them all. They are like the parts of a vital organism; one exercise acts directly upon the others, and the exercises follow each other in logical and progressive order. If one starts from rest too suddenly it tries the heart. Sometimes it brings on aneurism, or difficulty in the great aorta, or some other artery, occasionally producing

sudden death. On the other hand, if one is acting up to his highest power and stops suddenly, the danger is almost as great as in starting too suddenly.

The question has arisen: Is *music valuable as an accompaniment to physical exercise.* Unqualifiedly, yes. Music acts upon the nervous system in a mysterious way. It is valuable, and, for the highest ends of culture, invaluable and absolutely necessary. Right here we find a law in psychology. All psychologists agree in saying that unity is developed from feeling; — that a writer whose literary productions are marked by unity, obtains that unity from his feelings, and not from his judgment nor from any intellectual faculties. They say it is absolutely impossible for the intellect to write according to the laws of unity in composition, but that feeling will always develop unity far beyond what the judgment can even dictate, to say nothing of realizing. Now, one great object of these exercises is unity. The impulse of feeling which music can give will help one to realize that unity. Thus we might say logically, *music appeals to feeling, and from feeling springs unity.*

Again, *this system of physical culture develops the relationship of mind to body, and is, therefore, psycho-physical culture.* The exercises are such as express in due order the four grand attributes of the human soul.

These attributes, which are expressed in all normal movements of the body, are *life*, *manifest in consciousness*, *affection*, *intelligence and will*. These qualities of the soul have legitimate channels of expression. They have natural channels of expression in the tones of the voice, and they have natural channels of expression in the movements of the body. The body is generally so constricted that the intellect, if ever so active, cannot express itself through the body, and although the body is the natural servant of the intellect, when contracted into the rebellious servant it will not respond to the intellect. This misrepresentation of the soul by the body is so common that many persons possessed of loving and benign hearts have bodies which, in their attitudes and movements, express direct antagonism to the law of affection. A Christian heart cannot express itself through a savage body. God gave the soul a body and said to it, "Speak through the body." All the movements, then, in this system of physical culture, are expressions of some one or of a combination of these attributes, which should guide the soul in human conduct. These great attributes were intended to give man life, affection, intelligence, will; but man has perverted them until we have sickness in the place of life, hatred in the place of love, ignorance in the place of intelligence, and weakness in

the place of will. So it is with the body. There are souls that are partially divorced from their bodies, while yet they dwell in them; that is to say, they are divorced from them so far as soul manifestations through the body are concerned. For illustration, take a person who has cultivated the intellect at the expense of the body. I have seen, sometimes, in the physical movements of great students a resemblance to semi-idiocy. Giant faculty has starved the rest of the organism. Why is that so if the body is intended by its Maker to express intelligence? It is because the body has not been commensurately developed. The result may not be seen in an enfeeblement of the intellectual activities, but the wrath that comes in consequence of a violated law deals with the violator personally. It is the body in this case that has sinned, and as it refuses to obey the intellect, punishment swift and sure seizes it; and thus we have giant intellect imprisoned in a debilitated body. *We must educate the body with reference to the soul.* The old tradition of Beauty and the Beast has a deep moral significance. What a monstrosity would it be for the Beast (the Body) to ride Beauty (the Soul!) When we come to the last analysis, we find that the only legitimate office of the body is to express the soul, until

"The tongue be framed to music,
And the hand be armed with skill,
The face be the mould of beauty,
And the heart the throne of will."

The claim is sometimes made that the mind should not work in physical culture. This may be an excuse for those who have no minds. If we watch an idiotic child at play, we will observe that he does not play according to any definite plan. How is it with intelligent children? John says to James, "Come, let us play 'hide and seek.'" The game has its laws, and how definitely and enthusiastically those boys play, even though they are playing the game for the five hundredth time! It is said that children do not like repetitions. Look at them playing ball day after day, week after week, month after month. Cultivated and uncultivated people play alike; the refined and the unrefined will play lawn tennis day after day, and will become mad with delight in the game, doing the same thing over and over again; yet it is said, "playing has no mind in it." Now, what is playing, carried to its last analysis? Playing is allowing the body to obey the monitions of the will. Whenever the body is following the dictates of the mind, one feels that he is playing. Play stands over against drudgery and slavery of movement. Why do I not like to work? Because

ordinary labor is servitude. Why is it slavery? Because I am working for a dollar a day? Oh no, but because I am doing something for a dollar, and not doing something because my soul prompts the doing of it! But if I were doing that which my soul prompts, it would be play, and I should rejoice in the play.

This leads us up to the last grand principle which all this suggests, — that the body of man was not made for the lower walks of life alone, nor for itself alone. In the lowest walks of life it has to work steadily and constantly to maintain itself; in the higher walks of human nature the body rises to the grand stature of a man in the spirit who obeys instinctively the high behests of the soul. The body becomes happy, the body becomes healthy, the body becomes graceful, the body becomes beautiful, when the great attributes of the soul flow through it unhindered. The soul is not sick and the mind is not sick if the proper relationship exists between the human being and his Creator. When these attributes of the mind pour themselves down through the beautiful channels of the physical organism, the physical organism is not sick; and I absolutely believe, from the best of testimony, and not as an abstract theory, that if man would maintain and develop the relation between the higher qualities of his soul—intelligence, will, affection, life,—

and the Author of the soul; and then, would maintain the proper relationship between these attributes of the soul and the body in its movements, there would be no sickness. "But," says one, "do you not agree with some who say that sickness is a concept of the mind?" No, I do not. Disease is a positive fact in the world, and it takes many forms. Animals have it. They had it in this world before man existed. We find cases of disease in the fossil remains of animals that existed before man. Disease was upon earth then. Therefore, disease may come from ten thousand sources; but over and above the animal stands the soul of man, and while that soul may not bring by any false concept all the diseases of the body, it is a mighty resource to call upon in restoring the body when it is sick. A healthy spirit will not long carry around a sick body. It will either cure it or cast it off. But the spirit must act according to definite methods. It is not merely that I imagine myself well, and that, therefore, I am well. It is that I become well by lifting the soul into the realms of goodness, of beauty, of truth, of pulsating divine life, and then practising methods of exercise for the body that will invite those beneficent impulses to pass into and through it. Away with the physical culture that makes the body the drudge and the slave! Practise

the physical culture that lifts the body until one might really say that the body thinks, — until every fibre of its being shall pulsate under the inspiring touch of thought. Men say to us, "Why, this system is very good for developing grace, but it is not what we want for the average man and woman." But do we not want our children to become beautiful, to become healthy, — to carry themselves as though they were the sons of God, and not the sons of a slave? These are universal demands.

We do not need to contend for this culture, because we know that the demand for it is deep-seated, — seated in the very joints and marrow of the human physical economy; seated also in the human soul; and I know it is only a question of time when there shall go up a universal cry from all parts of the earth, "Give us a system of physical culture that frees the body, and subordinates it to the highest uses of the soul, — that develops beauty, gives strength and endurance. We plead not for it; we urge it not. The ancients believed that angry fates had determined certain things. I believe that the laws of nature, which are the angels of the Most High, and obey His mandates, are rolling on the time when "the child shall die a hundred years old,"* when sickness shall fade

* Isaiah lxv., 20.

from the world and with it the sins of the soul. Then men shall stand up with no sickness in the body, and no taint of sin in the soul. "Now are we sons of God, and it doth not yet appear what we shall be." My hope for the human race is bright as the morning star, for a glory is coming to man such as the most inspired tongues of prophets and of poets have never been able to describe. The gate of human opportunity is turning on its hinges, and light is breaking through its chink; possibilities are opening, and human nature is pushing forward toward them. I believe in the divine fulfilment of man's destiny. I believe that a crown is developing within him; and when it shines upon his brow it will not be a crown put there as a master might put one upon a slave, but a crown coming up in wreaths of splendor from his own soul and body. The crown comes from God, but He develops it through the righteousness of man. "Thenceforth there is laid up for me a crown of righteousness, which the Lord, the righteous judge, shall give me at that day, and not to me only, but unto all them, also, that love His appearing."

THE EXERCISES.

FIRST DIVISION.

EXERCISES FOR OVERCOMING STOOP IN NECK AND SHOULDERS, AND FOR SECURING PERFECT POISE.

FIRST, — EXERCISE FOR OVERCOMING STOOP.

TAKE the entire weight of body upon the balls of the feet, the toes pointing outward and describing an angle of about sixty degrees, and heels nearly touching each other. Place the arms as ~~in~~ Fig. 3, then push with the hands in the direction indicated by the arms (at an angle of forty-five degrees with the body), and at the same time push up and back the crown of the head. Hold head and torso in the position secured by this exercise, and let the arms drop easily at sides.

FIGURE 1.

FIGURE 2.

By frequently practising this, the head and neck will finally be brought into a line with the entire spinal column, as seen in Fig. 1, the opposite of which is seen in Fig. 2.

SECOND, — EXERCISE FOR SECURING PERFECT POISE.

In the position acquired by the above exercise, and with chest leading, poise the body as far forward as possible (without losing equilibrium), then as far backward as possible, maintaining throughout the entire exercise the same angle between chest and floor as in beginning. See Fig. 4.

Now swing the body back to first position, rise on toes, descend to position, touching heels lightly upon the floor, rise again and hold while counting four, then descend slowly to first position. Fig. 4.

Now take the weight upon the ball of right foot, heel gently touching the floor. Swing the left foot in a way to describe a circle around the right (Fig. 5), then back, not allowing it to touch the floor, and, finally, holding it behind the strong foot, poise the body forward, backward, to position, etc., as upon both feet.

Transfer the weight to the other foot and repeat exercise.

First, — All organs in the body, especially the vital organs, are lifted to their proper altitude. The spinal column resumes its naturally erect position, poising the head gracefully upon the neck, the neck rising from the shoulders like a classic column.

The whole person is in exact relation with the law of gravitation. Each part of the person is so lifted up from every other part as to give it perfect freedom to act in its own sphere. The head does not oppress the neck, the neck does not oppress the chest, the chest does not oppress the viscera, the viscera does not oppress the hips, the hips do not tax the knees for support, the knees do not call upon the ankles for undue exertion.

The unconscious friction that takes place in persons not cultivated by proper exercises is alarming. It undermines the constitution and invites disease in every part, as a penalty for violating the law of *freedom* in *unity*, toward which the law of physiological relationship everywhere in the human economy tends.

It is a demonstrated fact that no organ will fully perform its function while in a position below its normal altitude. I have never seen a case of chronic dyspepsia or torpidity of liver in which the organs

FIGURE 3.

were in their proper place. As soon as they are habitually carried at their normal altitude, these diseases and all consequent upon them cease.

Second, — These exercises exert a powerful effect in strengthening the nerve centres, and harmonizing all the nerve forces, even to the extent of curing partial paralysis.

The nerves which sustain the vital organs are relieved from undue exertion, and the perfect self-command required in poising with such nicety, harmonizes the nerve action. All nerve force is thereby properly directed, the habit of too much activity, which results in such a misery of unrest, is commanded, and repose, which prevents overwaste of nerve tissue, is secured.

ÆSTHETIC VALUE.

The chief noticeable result, æsthetically considered, is that appearance of person termed *good presence*. The unity, dignity and ease manifested in one while in repose, are of the most potent and subtle nature. It is presence which seems to tell what the individual *is* in his essential being. What a person is affects us much more than what he does. He who is perfectly poised suggests great moral weight.

All grace and beauty of bearing and movement depend primarily upon obedience to the following laws:

EQUILIBRIUM AND MUSCULAR SENSE.

The first law is obeyed in obtaining right relations with the earth. Again, it is obeyed in lifting up the parts of the person so that there is a diffusion of energy throughout the entire system, each part contributing its required share, thereby giving the effect of *ease in force*, which is power.

The second law is obeyed in maintaining perfect poise of body while standing upon one foot, and the climax is reached in poising upon the toes of that foot; for all poise is maintained, not alone by will or knowledge of how to poise, but by *muscular sense*. It is by a highly developed muscular sense that the trapeze performer balances with such beauty and accuracy on the rope; and a Blondin walks a wire above Niagara, carrying another man with perfect safety from shore to shore. It is a fine *muscular sense* which enables all celebrated performers of this description to walk with such ease, dignity and grace.

FIGURE 4.

MUSCLES INVOLVED.

The harmonious activity of so many muscles is such that no one can be said to lead. There is an elastic activity of all the large muscles of legs, trunk, and neck.

SECOND DIVISION.

EXERCISES FOR HIPS, WAIST, CHEST, AND NECK.

FIRST, — Correct standing position, with tips of fingers resting lightly upon the shoulders.

Now, take the weight entirely upon one foot, and by a slow, steady movement send the hip corresponding with strong foot, out at the side as far as possible, not allowing the chest to sway, but using it as a strong centre, as if the hips were to revolve about it. Keep the shoulders level. When the person is in this position he is much below his normal height. See Fig. 6.

Next glide the weight from one foot to the other without rising. This is accomplished by bending the knee of the strong leg while straightening the other, and, at the same time, sending out the opposite hip.

At the medium point in gliding from one foot to the other, the knees are equally bent. Repeat this exercise and return to position.

FIGURE 5.

HYGIENIC VALUE.

The physical benefit to be derived from this exercise is in overcoming that friction in walking which exhausts the back and stomach; also in exercising the muscles across the stomach in a way to strengthen and promote its activity, and thereby develop the unity of action between those muscles which play upon and move the stomach and aid in the peristaltic wave, and those of the legs, so that whenever the individual walks, or stands upon one foot in ever so unconscious a manner, a direct quickening of the digestive forces will take place.

By this habit the exercise which wastes the tissues will, at the same time, develop the vital supply.

ÆSTHETIC VALUE.

The secret of grace in walking lies in this: that the legs and hips are made to serve the chest instead of being allowed to lead it. This gives the feeling that the moral and intellectual powers of the soul govern the passions, while the too common and vulgar manner of walking conveys a feeling of uncertainty, and that the person is not controlled by what is best within him.

There are three modes of walking with reference to the hips.

First, — An easy movement which allows a slight play of the hips while the chest keeps its position so reposefully that if the person was seen down as far as the waist only, he would seem to be sailing in a boat upon a smooth river. I have borrowed this figure from the tradition concerning Buddha which tells us that when he was walking, unless one could see his person below the waist line, he seemed to be sailing in a boat on a smooth river. We do not claim that this exercise alone will produce the ideal walk, but it develops the first conditions, viz., a strong chest and free hips.

Second, — One can swing the body with the hip, giving the movement usually termed "rolling gait."

Third, — The hips may be held stiffly, and at the same time no roll take place in the upper part of the body; but to prevent this vulgar sway, one would be obliged to attract attention to the rigidity manifested throughout his whole person.

The natural office of beauty is to indicate goodness, and this is the reason why we instinctively feel attracted to strangers of graceful movements, and are as strongly repelled by those who are awkward.

FIGURE 6.

PRINCIPAL MUSCLES INVOLVED.

The diaphragm, all the abdominal muscles, including the intro-abdominal, the iliacus, anterior femoral, and muscles connecting thigh with hip and knee.

EXERCISE FOR FREEING AND STRENGTHENING SIDES.

Place thick of hand upon floating ribs, merely as a guide to the mind, not to assist the muscular effort; draw the sides as near together as possible, as in Fig. 7, then send them as far apart as possible, as in Fig. 8. Repeat this movement, and then allow the arms to fall at sides. During this exercise a perfectly upright position is to be maintained; the body is not to bend in the slightest degree.

HYGIENIC VALUE.

The exercise gives great activity to the stomach by causing it to fall and rise as it does during the respiration of very powerful men and women. It carries this needed motion to much greater extent than can be

accomplished in breathing except by the most gigantic persons. It is a very vigorous exercise of the most powerful muscles of respiration. The will is exerted exclusively in moving the sides, no thought being given to respiration, which takes its own automatic course in accord with the movement. It develops greater breathing capacity, and gives more freedom to the vital organs.

ÆSTHETIC VALUE.

The appearance of narrowness of feeling and constraint of manner offends the taste. Intuitive taste always demands in appearance what moral philosophy demands of character. Moral sentiment requires sympathy and magnanimity, and good taste requires their expression. The æsthetic sense is made up mostly of feeling; it does not reason upon truth and goodness, it feels them. It is influenced in such a subtle way that one usually fails to recognize the cause. By careful observation I have been led to believe that the sides appeal to the feelings of sympathy and magnanimity, either attracting, repelling, or neutralizing them. The effect is not produced by their breadth or narrowness, but by their freedom or restraint.

FIGURE 7.

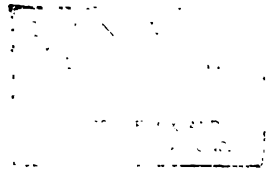

FIGURE 8.

FIGURE 9.

PRINCIPAL MUSCLES INVOLVED.

Serratus magnus, Intercostal, Diaphragm, and Abdominal.

EXERCISE FOR DEVELOPING GAMUT OF CHEST, PERPENDICULARLY.

Take a good standing position, place the ends of fingers lightly in region of third rib, (as seen in Fig. 9) lower the chest at this point as much as possible by an effort of the will, allowing every other part of the body to accommodate itself to this attitude. Now lift the chest directly up towards the chin, as seen in Fig. 10. As a consequence, the shoulders come back to place, the spine becomes erect, the crown of the head rises to its utmost height. Repeat this exercise, then take normal position.

HYGIENIC VALUE.

The exercise deepens the capacity of the chest, furnishing more room for the lungs; gives powerful exercise to all the muscles that control the ribs, and strengthens all the muscles that hold the internal organs

in their proper places. I cannot state with satisfactory emphasis the importance of keeping all the organs contained in the trunk of the body, in their proper positions. While this exercise attracts attention to the thorax only, it is an exercise of such extensive reach, as to cause all the muscles of the trunk to move in harmonious unison.

It exercises the muscles of the trunk in such a manner as to invigorate the vital organs. While the main source of this activity is in the nerves which furnish the stimulant to these organs, the proper exercise of the muscles that surround them and hold them in place, exerts an influence that assists their activity in two ways, by moving the organs, and by reflex action upon the nerves that supply them.

When the lungs are sufficiently high, by means of a well-elevated chest, what is termed thoracic breathing, as distinguished from diaphragmatic breathing, is never practised, because one cannot get satisfaction. In normal respiration the diaphragm descends during inspiration and ascends during expiration, the abdominal muscles moving consistent with it. This not only causes the lungs to fill, but by the continuous movement of the diaphragm and abdominal muscles the organs below the diaphragm, as well as above, are kept in constant motion, thereby promoting a free circulation

FIGURE 10.

and aiding digestion very materially. Little children always breathe in this manner, and so do the adults of the strongest races, and also strong individuals of both sexes in all races. Some physiologists teach that this method of breathing is not, normally, continued by females after the years of puberty. We answer simply, that it is always continued by the strongest women, and to keep up the tone of the organs below the diaphragm, it is necessary. Normal breathing is perfectly secured by keeping the chest sufficiently elevated.

Keeping the chest in this position prevents all attempts at abdominal breathing and singing, which many physicians know is so injurious, especially to females. No attempt to breathe abdominally should be made. Maintain a right position of chest and correct breathing will follow as a natural consequence. All efforts to breathe correctly in a false position are injurious. Nature, in her infinite kindness, suits the breathing to the position, otherwise life would often be endangered by the simple act of breathing. In nature, function is according to form, and form is according to use.

This exercise joins with others in enlarging the bust, and producing delicate lines about the lower part of the waist, such as the use of the corset seeks to effect, and of which it gives a counterfeit at the sacrifice of beauty elsewhere.

We may be sure that if among civilized people an artificial custom is retained a long time, it points toward some need that would produce beauty, and therefore health.

Women, and sometimes men, have for hundreds of years, used artificial means to cause fulness of bust and delicacy of the lower waist line. The mind holds that form as an ideal of beauty. The ideal is natural and true. It did not spring from false custom, but grew out of the very structure of the mind. No amount of preaching can uproot it. No penalty, thundered by reformers into the ears of young ladies, can change their conduct in this matter. They sometimes see a companion die, and hear the attending physician say that death was caused by tight lacing, but, as if moved by the hand of fate, they continue in the same habit, and seem to say, "I would rather die than not to appear beautiful." From a study of the history and habits of the human race it is very evident that there is nothing

FIGURE 11.

else for which human beings are so willing to suffer as they are for beauty. This is not owing to perversity in human nature. If we look deep enough we shall see that this love of being beautiful springs from an innate desire to be perfect. Beauty is the natural sign of truth and goodness. Poor humanity is often mistaken in regard to the method by which truth and good are obtained.

Let us cease this war of words against corsets, for when true physical culture has developed the bust, and given the corresponding waist line, the instinctive desire for beauty will cause all to turn away from the false method to the true, and corsets and all like inquisitorial machines of torture will take their places in the museum of antiquities, beside the rack and thumb-screws of the Spanish Inquisition; one showing the sacrifice and suffering of humanity consequent upon its search for pure religion; the other, what it endured in its desire to attain beauty. Superstition dies a natural death when true religion comes, and perverted fancy expires in the light of natural beauty.

Another point of beauty which this exercise helps to develop is a good voice. It strengthens those muscles which condense the air in the lungs, and thereby gives fulness and evenness of tone. Surely voice culture should be included in physical culture, and was so

included by the Greeks and Romans. A person with a sweet and rich voice always seems beautiful though possessing ugly features.

PRINCIPAL MUSCLES INVOLVED.

Triangularis sterni, Pectoralis major, Pectoralis minor, Sterno cleido mastoid, Trapezius, Serratus magnus, Erecto spinæ, and Subclavius.

EXERCISE FOR WAIST.

Place thick of hand on top of hips, fingers pointing downward, thumbs forward; continue this position throughout the exercise; bring the thighs a little forward; bend that part of the body forward which is above the ensiform cartilage (see Fig. 11); do not let thighs or hips move from the first position you give them, but continue bending the body, following the arc of a true circle around to right side (see Fig. 12), then to front, then around to left side, then front, then right, then to left again, then to right and around to back (see Fig. 13), and continue around to front, then turn to left and go entirely around to front, then lift the body gracefully to position.

FIGURE 12.

This exercise, like all the others, should be taken slowly, strongly, and with precision.

Too great a pressure will come upon the back unless the thighs are kept far forward. If any unpleasant sensation is experienced in the back it is because the thighs are not in the right position when rotating the body backward. Let the shoulders, with upper part of chest leading, describe as large and true a circle as possible. Allow the head to follow the chest, with neck relaxed.

HYGIENIC VALUE.

All the contents of the abdomen, but more especially the stomach and liver, are seized between the abdominal muscles and diaphragm, and pressed very strongly during all the movements that describe the front half of the circle, and relieved during the movements that describe the other half of the circle. This exercise is in direct obedience to the law of physiology that alternately contracts and relaxes throughout the human system, pressing and relieving by turns every part. All growth and strength is promoted and sustained by this law. It is by this mechanical pressure and relief that the blood circulates, the glands send forth their secretions, the peristaltic wave is produced, and

tissues developed to meet special demands. If pressure is continued upon any part atrophy is the consequence; but by pressure and relief following each other in reasonably rapid succession the part is made stronger and more vigorous. This is the effect produced upon the vital organs by this exercise, and thereby more and better blood is manufactured. All exercises should be aimed primarily at producing more health. It is the vital organs that produce the substance of life, health and strength. This exercise is for the especial purpose of acting upon these organs in a manner to quicken and strengthen them. The physiological cry is for good and abundant material to make into muscle, nerve, tendon, bone, brain and every other tissue. It is the vital organs that must furnish all this material. Therefore, instead of aiming all our gymnastic work towards developing mighty muscles, which are a great and constant drain upon the vital organs, the main object in physical culture should be the care of the organs from which the fountain of life flows. In this exercise many of the most powerful muscles are being strengthened, and are, at the same time, using all their strength to develop into higher and healthier activity the vital organs. This exercise frees and develops the articulation of the thorax with the abdomen. No such articulation is named in anatomy, neither can it be

FIGURE 13.

discovered by dissection; still it is easy to see that there is at the line where the diaphragm connects with the walls of the trunk such dividing movements as resemble an articulation; therefore I have used that term for convenience. This articulation is so important that it requires several others to do its work for it whenever it is not permitted to do its own, thereby causing great exhaustion in the system, and weakening the vital organs.

ÆSTHETIC VALUE.

In all Greek sculpture of the entire human form this articulation is very apparent. To perceive its beauty and movements one has but to imagine it left out, and the æsthetic feelings will experience a shock. All curves in the posture and movements of the torso are gone, and a stiff and unsightly angularity is discovered in the place of them. The great artist Rubens, in the pictures he painted to express his ideals of abundant life and health, especially marked the definition of this articulation.

PRINCIPAL MUSCLES INVOLVED.

Abdominal, Diaphragm, Latisimusdorsi, and Serratus post inferior.

EXERCISE FOR FREEING THE NECK.

Take an erect position. Bring the head forward and down until the chin touches the chest, if possible, Fig. 14; carry head around to right shoulder, Fig. 15; then tip back of head on to left shoulder, face looking perpendicularly at ceiling, Fig. 16; now twist the head backward on the neck as severely as the strength will permit. Again bring chin upon right shoulder, and keep it close to breast while carrying it around to left shoulder, then throw back of head on to right shoulder, then twist the head backward as before, then bring chin upon left shoulder and carry head to first position on chest, then raise it normally.

HYGIENIC VALUE.

The exercise frees the circulation of the blood in the neck, especially at the base of the skull, where this need is greatest. Many experience much suffering in the back of the head and neck, owing to imperfect circulation in that region. This exercise is very beneficial to all, and especially to persons whose business calls for a great deal of nerve force and brain work, such as teachers, lawyers, clergymen, students, and persons carrying on great business enterprises; also in cases

FIGURE 14.

FIGURE 15.

where there is or has been any tendency to nervous prostration. The exercise is helpful to those who have ever had trouble with the head in any way. It serves to regulate the supply of blood that goes to the brain by toning up the arteries and veins that connect with the head and brain.

ÆSTHETIC VALUE.

The neck exercise gives an easy poise to the head, taking away the appearance of limitation of intellect and rigidity of manner. A rigidity of neck often misrepresents an individual. We are obliged to judge of the soul by its representative, the body, until fully acquainted with the person, when the physical misrepresentation becomes painful to us, making us feel as would a published slander concerning a friend. The people are not few whose bodies are a public libel upon their characters. All this could be remedied by this system of æsthetic physical culture.

PRINCIPAL MUSCLES INVOLVED.

Platysma myoid, Sterno-cleido-mastoid, Sterno-hyoid, Sterno-thyroid, Omo-hyoid, Thyro-hyoid, Genio-hyoid, Mylo-hyoid, Stylo-hyoid, Stylo-pharyngeus, Rectus cap-

itis anticus major, Rectus capitis anticus minor, Rectus capitis lateralis, Scalenus anticus, Scalenus medius, Scalenus posticus, Splenius capitis et colli, Trachelo-mastoid, Complexus, Biventer cervicis, Obliquus capitis superior, Obliquus capitis inferior, Rectus capitis posticus major, Rectus capitis posticus minor.

FIGURE 16.

THIRD DIVISION.

THE EXERCISE OF HEAD, ARMS AND LEGS IN THEIR RELATION TO THE TORSO, TO THE END OF DEVELOPING AND SECURING THE VITAL UNITY OF MOVEMENTS AND ATTITUDES.

IN the physiological design of the muscular system all the different groups of muscles are so arranged as to assist each other in every effort.

If the muscles that sustain any particular member are called upon to perform any task, usually several other groups automatically volunteer their services in aid of the leading one. The muscles of the trunk of the body are, in all normal exercises, called upon to sustain the efforts of the upper and lower extremities. Again, if the arms and legs are exercised in the right manner, such as the structure of the organism demands, there is a reflex action brought to bear upon the muscles of the torso which increases its vital power.

In this way there is a reciprocal benefit obtained by the trunk of the body, and the neck, arms and legs. Every exercise that an arm or leg takes should involve, in addition to its own muscular development, a definite exercise of some part of the torso. A teacher of physical culture should always become certain of what effect an exercise will have upon the trunk of the body; the arms and legs are the natural servants of the body in all their physical uses. Movements of the arms and legs should have as their ultimate purpose the strengthening and vitalizing of the torso, and should be definitely arranged to this end, because in the torso is the factory of life.

Two questions, at least, are always to be asked regarding the correctness of every exercise.

First,— What will the exercise do for the part that leads?

Second,—What will it do for the trunk of the body?

The object of all the exercises in this division is first, to develop the trunk of the body by means of exercising its branches; second, to develop the branches; third, to establish unity between all the parts in accomplishing definite ends.

FIRST EXERCISE OF THE THIRD DIVISION.

The person is supposed to maintain a perfect standing position, as in Fig. 1, during this entire exercise.

Take a full breath and hold it in the lungs by means of the contraction of the superior (or false) vocal cords. While the breath is thus held, turn first the right arm around, lifting it up and carrying it over back, thus revolving it like a wheel upon its axis — the shoulder representing the axis, and the arm the wheel, as in Fig. 17. In each revolution carry the arm back as far as possible. Repeat this movement with the right arm, then exercise the left arm in the same manner, then both arms together.

One breath may be held during the entire exercise; or it is better for all but the strongest to take one breath and hold it, in the manner described, during the two revolutions of the right arm, then to exhale and take another breath and hold it while the left arm performs its revolutions, then to let out breath and inhale a third time, holding the breath during the simultaneous revolutions of both arms.

If dizziness should ensue, take less breath and change it oftener; dizziness oftener comes, however, from not assuming an elastic manner than from holding the breath too long.

As the strength increases the breath can be held a longer time.*

HYGIENIC VALUE.

First the apexes of the lungs are filled with air. From many years of study and observation I am convinced that the apexes of the lungs never fill without the closing of the false vocal cords and the simultaneous relaxing of the muscles of inspiration. I will say more of this when naming the muscles involved in taking this exercise.

Consumption, as a rule, commences in the apexes of the lungs. The cause for this is that, for some time previous to the deposit of tubercles, the air cells are not properly filled during respiration, and therefore are, in a measure, collapsed, which weakens the walls of the cells until there is not sufficient tone in the tissue to resist a foreign deposit. Therefore tubercles are deposited in these debilitated walls. That is not all; when the apexes of the lungs do not fill there follows,

*Some have questioned this exercise on the ground that it may abnormally distend the air cells. A profounder knowledge of physiology would clear the mind of this objection. One cannot voluntarily hold the breath long enough to cause abnormal distention of air cells ; but, on the other hand, holding the breath by means of the superior vocal cords for a time prevents fixity of air cells, and quickens their contractility instead of producing distention.

FIGURE 17.

of necessity, a lack of oxygen in the blood, and, consequently, the blood becomes impure, which serves to increase the deposit in the lungs and devitalize the whole system.

The nervous system is to a great degree dependent upon oxygen for its health and vigor, and if it is deprived of a part of its natural supply, it becomes more or less prostrated. Digestion and assimilation are retarded for want of a sufficient amount of natural stimulant, for the air that is breathed into the lungs is the natural tonic required by the stomach and assimilating powers.

We see from the foregoing that from this exercise, while it frees and develops the muscles of the shoulder and arm, the chief benefit derived is health of the lungs and through them health of the whole person. That is not all; life itself may depend, in many cases, upon the practice of this exercise. I have known some cases of incipient consumption to be cured by it.

PRINCIPAL MUSCLES INVOLVED.

Pectoralis major, Pectoralis minor, Subclavius, Serratus magnus, Deltoid, Supraspinatus, Infraspinatus, Teres major, Teres minor, Subscapularis, Coraco-

brachialis, Biceps flexor cubiti, Brachialis anticus, Triceps extensor cubiti, Subanconius.

We must also include all the muscles of respiration, both the inspiratory and expiratory, which constitute at least sixteen pairs. We see by this *what a vast number of muscles are exercised, and that all of them are combined in one effort to strengthen the lungs and through them to give vigor to every part of the body.*

This exercise of swinging the arms in a rotary manner is not original with me, but doing so while holding the breath with the vocal cords, was first taught by myself, so far as I know.

The chief value of this exercise is not in swinging the arm, but in exerting all these muscles for the benefit of the lungs; therefore very little comparative benefit is derived from it unless *the breath is held in the lungs by means of the vocal cords.*

That this subject of respiration may become clearer to the reader, I will explain the *modus operándi of*

NORMAL BREATHING.

When inhaling, the diaphragm, which is a muscle of inspiration, is contracted, and thereby lowered, the floating ribs are drawn away laterally, and the long ribs are lifted; thus by these movements on the part

of the floor and walls of the thorax, the cavity of the chest is greatly increased, so that the lungs can be made to hold many cubic inches of air; but there is one thing to be particularly noticed, viz.: that the expansion of the thorax is principally at and near the base, hence the air will be taken into the lower parts of the lungs while the apexes will not fill at all during inhalation. When a perfectly healthy person has fully inhaled, the superior vocal cords close simultaneously with the relaxing of all the muscles of inspiration and the contraction of all the muscles of expiration. These latter muscles drive the air upward, but it cannot escape easily from the lungs because the superior vocal cords, by their contraction, have closed the glottis, and they must be driven apart by the air being forced up between them. While the breath is escaping with such difficulty, it will be driven into the apexes of the lungs.

This statement may be questioned, and as I have no authorities to quote in reference to *the part the vocal cords take in healthy respiration*, no one ever having attributed this action to the superior vocal cords, I will briefly state my reasons for believing this to be their office.

First, Dr. Polk and other writers upon phthisis have said that the air during inspiration always tends toward

the base of the lungs, and that consumptive patients fail to fill their lungs during respiration for some time previous to more active symptoms. This led me to try to discover what causes the apexes of the lungs to fill in a healthy person.

I experimented, first with a healthy puppy, and discovered a confirmation of the statement of writers on this subject, that the air during inspiration all tends to the base of the lungs, and that the apexes do not fill during inhalation. I was soon able to see, by this examination of the higher order of animals, *that the apexes, whenever filled, were filled during expiration of breath.*

After obtaining this cue from the animals, I was able to detect, by listening to the respiration of the human lungs, that the apexes were filled during expiration only.

As yet I was not able to decide whether it was the inferior or the superior vocal cords that acted in connection with the muscles of expiration.

Finally, becoming acquainted with Dr. Cutter, who has revealed so much of the action of the larynx by means of his skilful use of the laryngoscope, and while looking into his larynx I discovered that it was the superior vocal cords that acted with the muscles of expiration.

FIGURE 18.

It is evident, therefore, that the superior or so-called "false vocal cords" have a natural use, which is so important that the continuation of life, for any reasonable time, depends upon their action.

In many books of the past it is said that "the use, if there is any, of the superior vocal cords, is not fully known." Some one has presented the theory that they have no use, but are the remains of some organ that was of value in the ancestry of the race.

ÆSTHETIC VALUE OF THIS EXERCISE.

The exercise reacts upon the carriage, especially in giving an elastic and radiant appearance to the whole person; for the entire exercise is of the most elastic class, being one that is based upon movements that relate to the elasticity of the air in the lungs.

BENDING EXERCISES.

FIRST MOVEMENT. — FORWARD BEND.

Place the heels together, or nearly so, carrying out the toes so that the feet, taken together, form a right angle.

Take a good standing position, as in Fig. 1. Carry the arms up as high as possible, placing them each side of the head and pushing with the ends of the fingers in a way to stretch the entire person, as in Fig. 18, then with a sweeping forward curve, describing an arc of as large a circle as possible, carry the ends of the fingers toward the floor (Fig. 19), aiming to reach it as soon as the practice of this and the other exercises has made the body sufficiently elastic. Let all the joints bend that will aid in reaching the floor, except the knees. After holding this position a second, rise slowly to normal position, allowing the arms to fall easily at the sides of the person. If this exercise is taken rightly the chest will come to its correct position first, then the head will resume its normal poise.

SECOND MOVEMENT. — BACKWARD BEND.

Place the tips of the fingers of both hands lightly on the chest, as seen in Fig. 10; carry the head backward and down upon the back; in doing this, describe with the head as large an arc as possible. Do not let the body bend, but carry the head backward until the front part of the neck is severely pulled, and a powerful stretching of the muscles is realized; then, by bending

FIGURE 19.

FIGURE 20.

the knees, allow the body to go backward and down, not bending the back but keeping it as straight as possible, feeling the weight and strain in the legs only, not allowing any effort to be felt in the back; then come slowly up, leaving the head upon the back until the torso is in normal position; when that is erect, poise the head and carry the arms to the side.

THIRD MOVEMENT. — LATERAL BEND.

Carry one arm up over the head, as in Fig. 20, then bend towards opposite side from the arm raised, keeping the weight upon the foot of the same side of the arm that is raised, and carrying the other foot directly out at the side in a way to form a graceful curve extending from shoulder to foot; bring the body slowly up to position, then return head, arm and foot to normal position. Repeat the exercise with the opposite side.

FOURTH MOVEMENT. — FORWARD DIAGONAL BEND.

Take the same position and exercise as in forward movement (Fig. 19), only this time carry a hand each side of the toes of the right foot, instead of directly in

front of the body; then slowly come back to position as before. Repeat this exercise with the other foot as guide, after the following first backward diagonal bend.

FIFTH MOVEMENT. — BACKWARD DIAGONAL BEND.

Place the ends of the fingers of both hands lightly upon the chest, as in Fig. 10; without moving the body carry the head back and down towards the left heel and pull the head backward in such a line as to feel a stretching of the neck as close to the right side of the trachea as is possible; then, by allowing the knees to yield, bend toward the left heel (see Fig. 21); rise as before to position, bringing the head to position after the torso has its poise; then carry the arms to the sides. Repeat this exercise, after that of the fourth movement with the opposite heel as guide.

HYGIENIC EFFECT.

This group of exercises causes such a continuous stretch of the muscles, from the head to the feet, and also throughout the entire length of the arms as searches out all the muscles that from lack of proper development are in any degree feeble. It develops great freedom and strength in the muscles throughout the whole system.

FIGURE 21.

No other exercises can do more to equalize the circulation of the blood through all parts of the body. They develop what is sometimes called "staying qualities," that is, they enable one to endure hardships, and strengthen the body in such a way as to overcome the sense of weakness about the waist, back, and stomach, which many people experience, and which they express by saying: "I do not feel as though I could hold myself up when sitting, and, therefore, I always feel as though I must lean on something."

It will be observed that while one set of muscles is contracted to its utmost degree of power the opposite set is being stretched to its greatest extent.

Muscles cannot be developed to their highest condition by contraction alone, nor by being stretched; but being alternately contracted and stretched will cultivate them most perfectly.

ÆSTHETIC VALUE.

Continuity of line through all parts of the person is obtained. There is an evenness of development gained in all the parts, giving roundness, fulness, and symmetry.

Caution: Omit this exercise until the pupil has practised a great deal upon all the other exercises given in this and the previous divisions.

MUSCLES INVOLVED.

All the voluntary muscles except those of head and face.

REACHING EXERCISES.

FIRST MOVEMENT.— LATERAL STRETCH.

Take the entire weight upon one foot; swing the other around the strong leg as in Fig. 5, touching the heel of the foot upon which the weight is placed, with the heel of the other; then carry free foot out at the side as far as you can reach with the inner edge of the toe without swaying the body; lift the opposite arm directly toward the side of the head (letting the hand fall passive) until head and arm meet; next, depress the arm just enough to bring the palm of hand up so that the fingers will point upward, and push with the palm of the hand until you have reached position seen in Fig. 22; then come slowly and

FIGURE 22.

FIGURE 23.

gracefully back to position. Repeat this exercise with the other foot and hand.

SECOND MOVEMENT.—BACKWARD DIAGONAL STRETCH.

Take the weight on the foot first used in the lateral stretch; swing the other foot as before, this time touching the hollow of the strong foot with the heel of the free foot, forming nearly a right angle, and carry the free foot out in the direction the toe points, until the toe touches the floor as far from the other foot as it can be carried, being careful not to sway the body; then raise the opposite arm in front, describing an arc as you carry it backward until it forms an angle of forty-five degrees with the head, then straighten the arm and push in the direction it points until the foot is carried from the floor and the attitude seen in Fig. 23 is reached; come back to normal position, allowing the arm to describe the same arc as it did in taking the position. Transfer the weight to the other foot and repeat the exercise.

THIRD MOVEMENT. — FORWARD DIAGONAL STRETCH.

Retain the weight on the strong foot used in last exercise; swing the other foot, carrying it forward as

before; then slowly carry the entire weight forward on to the advanced foot, and lift the arm opposite the foot which extends backward, until the arm forms with the head an angle of forty-five degrees upward and forward. Reach with the hand as high as possible, as in Fig. 24, then slowly come to position, retaining the weight on the same foot. Repeat the exercise by swinging the other foot and raising the arm as before.

In all the exercises of this set, reach until the foot opposite the extended arm is raised from the floor and completes an unbroken line from hand to foot.

HYGIENIC VALUE.

These reaching movements are powerful exercises. They employ all the strength of the person, and as strength increases, will be taken with greater force. They draw a line of great exertion through the entire length of the arm and the opposing leg, and also through the torso between them. In the various movements, this stretch is repeated through a different part of the torso, and also through different parts of the arms and legs. These are strong exercises for the extremities, but even more powerful for the trunk of the person. They prevent curvature of the spine, and

FIGURE 24.

have cured several young persons of this disease. The stomach is exercised with great vigor. These exercises give strength and power of endurance to the entire person. They prepare one for carrying burdens; for the individual, each time he reaches in this manner, overcomes the resistance of opposing muscles, and, in addition, may put forth sufficient strength to lift his own weight.

ÆSTHETIC VALUE.

These exercises develop symmetry, and prepare the body to take easily and habitually such a posture in standing and walking as will express a spirit of nobility and radiant manhood or womanhood. They cultivate harmony of action between the sides of the body. An awkward person conveys the impression that his sides are compelled to live near each other much against their wills. This appearance is not always confined to persons of low breeding, but is often seen in those of refinement of mind and morals, the reason being that the body, for want of physical culture, cannot express the condition of the life within.

Man has a dual nature composed of feeling and intellect. In the finely cultured these are happily

joined, the feelings being consistent with reason; consequently the character is beautiful. The body is an expression of the soul; it, too, is dual, possessing two brains, two hearts (though joined), and two lungs. In the external form the same duality is apparent in its members, a right arm and leg involving right half of torso, left arm and leg involving left half of torso. In rude persons the sides seem to move as separate individualities. This same dual principle is manifest in the muscular system. The muscles, except four or five, are all in pairs, and are "symmetrical with reference to the median plane of the body." Feelings in the uncultivated are wild, and entirely unregulated by reason; the intellect is cold and severe, unsoftened by the feelings; but in the cultivated, feeling is guided by reason, and reason is warmed by feeling.

This condition of the inner being has its counterpart in the body, in the relation the sides sustain to each other in attitude and movement. Nature has created a demand for culture in all organic being. It is as necessary to educate the sides of the body in relation to each other, as it is to educate thought and feeling in their spiritual relationship. The cultivation of the latter results in Christian grace, that of the former in physical gracefulness, and thereby the body becomes

a fit and beautiful medium for the expression of Christian grace.

MUSCLES INVOLVED.

Nearly all the muscles of the neck, which have been named in connection with the neck exercise, making it unnecessary to repeat them here, and the muscles which connect shoulder and chest. All the muscles of the arms and legs and body. In short, all the voluntary muscles of the entire person, except those of the head and face are involved.

EXERCISE FOR STRENGTHENING CENTRES AND FREEING SURFACES.

Take a good standing position. Make the head, shoulders, chest and spine very strong, as if expecting to carry a great weight upon the head; prepare at the same time to resist with resolute determination a push from the front or back, not allowing the body to be swayed in any direction by any force, however powerful.

Lift the forearms to a horizontal position pointing front and parallel to each other. Do not hug the arms

to the sides nor push the elbows out, but let the arms hang easily from shoulders. Put no energy whatever into the wrists nor into any part of the hand. See Fig. 25.

Now swing the forearms rapidly up and down with all your might, but do not let the swinging of the arms move the body in the least. The ideal effort is to throw the arms with all the power of the person, and at the same time to maintain perfect repose of body. After swinging the forearms up and down, whirl them round in a circle, first one way and then the other, and finish the exercise by repeating the first movement and returning to normal position. Practise this exercise from one to two minutes.

ÆSTHETIC VALUE.

One of the most charming effects of proper physical culture is that it gives the person the appearance of being very strong in centres and free in periphery.

In contrast to the object sought in this exercise, is the clumsy appearance of persons who are in the habit of moving heavy weights with their hands; for example, the hard working stone mason, or any other laborer whose hands are compelled to perform heavier

FIGURE 25.

work than the energy of the chest impels. This appearance is very noticeable in persons who practise heavy gymnastics. Such attract attention to their hands by every movement, and are always very conscious of these members when in society.

In order to obtain and preserve grace, the muscles of the chest and shoulders should habitually exert more force than should those of the hands.

The great force is in the muscles of the trunk; the effort should grow less as the extremities are approached. This fact should serve us as a guide in our study of physical culture. The hand should ever suggest skill, as distinguished from the force that impels. It should never look helpless (such a hand is disgusting, no matter how beautiful its form) but should indicate ability to perform its true office, *viz.:* to obey the mandates of the intellect.

FOURTH DIVISION.

EXERCISES FOR THE DEVELOPMENT OF HARMONY OF MUSCULAR MOVEMENTS.

WE now enter upon the fourth division of physical exercises which we name, — *the relation of different groups of muscles to each other.*

UPWARD MOVEMENTS IN CURVES.

Weight entirely upon the ball of right foot, heel lightly touching the floor, left leg and foot perfectly passive. With wrist and hand passive, raise the right arm half way between front and side, carry it up beside the head as if to carry it over the shoulder. At the point where the forearm is nearly on a level with top of the head (do not be too precise about the altitude) let the arm descend, the *forearm* leading and

FIGURE 26.

FIGURE 27.

the hand following (see Fig. 26). Never allow hand or wrist to lead in any exercise of this division. As the arm slowly descends carry it to a position about thirty degrees back of the hip (see Fig. 27). Again, raise the arm and draw it down as before, this time leaving it in a passive state by the side.

Now draw the free foot up to the heel of the other, and, without attracting attention to the movement, transfer the weight, and repeat the exercise with other arm. While the arm is moving up and down it is expected that the head will move slightly in an opposite direction.

Next draw the free foot near the other and take the weight equally upon both; then lift both arms, bring them down and carry them back as in the single arm movement. Raise them again and as they descend allow them to approach each other until the thumbs nearly touch at an altitude corresponding to that of the chest, then slowly lower them till they fall easily by the sides.

Lift them the third time till the hands are directly over the head (see Fig. 28), then extend the arms laterally right and left (palms of hands and ends of fingers toward each other) until they are straight out at the sides and on a level with the shoulders. Now raise the arms (the forearms leading, as in Fig. 29, hands, with

palms up, following) until the palms nearly touch above the head. Turn the arms till the palms of hands are presented right and left, when the arms again descend to a level with the shoulders. From this point raise them until the backs of hands nearly touch above the head, as in Fig. 30 ; carry them forward and down to a level with face, palms directly in front, fingers extended upward, thumbs within one or two inches of each other. In this position push gently and elastically, then turn the arms so that the palms are presented toward face, the fingers pointing toward each other; carry the arms out right and left and finally permit them to rest by the sides.

As the arms move up and down in this exercise, the head moves slightly in obedience to the *law of opposition in the parts.* As the arms move simultaneously right and left from any point the head remains in repose.

Take the weight upon right foot, etc., as directed in first exercise of this division. With the front of forearm leading, carry the right arm upward as if about to lay the palm on the top of the head. Let the arm stop when the hand is within about four inches of the top, side and front of head (see Fig. 31), and slowly return the arm to former position. Repeat this movement. Now with the back of fore-

FIGURE 28.

FIGURE 29.

arm leading swing the arm in a graceful curve across the torso up and over in front of the head, as if describing an oval around chest and head, (see Fig. 32), thence down to the side with palm up; raise the forearm slightly, presenting the palm; then return the arm quietly to first position. Repeat. Transfer the weight to the left foot and repeat the entire exercise.

LATERAL MOVEMENTS IN CURVES.

Weight upon right foot as before described. With forearm leading carry the right arm up until it is within about two inches of the chest, and the ends of the fingers are about four inches from the left shoulder (see Fig. 33). Now carry the arm around toward the right side until it points directly out from the shoulder, with the palm front (Fig. 34), draw it back to former position near chest; twist the arm till the palm is turned outward, and again carry the arm around and out at the side; return arm to its position near chest; then turn it till the palm is downward and the edge of hand outward; repeat the movement of arm toward the right, draw it back toward chest till about half-way, then allow it to drop slowly by the side.

Transfer the weight to left foot and repeat exercise with left arm.

FORWARD MOVEMENTS IN CURVES.

Take weight upon the right foot, etc., as in former exercises.

With back of forearm leading raise the right arm so as to bring the hand beside the head, with palm to the front, fingers pointing upward, as in Fig. 35. With hand in this position extend the arm forward, as if repulsing an object (Fig. 36), then return the arm to position with hand beside the head; again extend the arm and bring it back to the side of the head, in which position the arm presents a graceful curve. Now carry the back of forearm, describing an arc of a circle, over and forward until it forms an angle of about ninety degrees with the head; raise the forearm slightly, allowing the hand to open freely as seen in Fig. 37; then bring the arm, with front of forearm leading, down to its normal position at the side. Transfer the weight to the left foot, and with corresponding arm, repeat these last movements.

Again take the weight upon both feet, and with a graceful curve of the arms present the palms of hands, then allow the arms to move to the sides and rest.

FIGURE 30.

FIGURE 31.

At the time the exercises of the fourth division are begun, the forces of the system are in a high state of activity; the heart is beating rapidly, and the lungs are correspondingly working with great speed, so that respiration is rapid, as one would quickly realize if he should attempt to read aloud, or speak for any length of time, at the close of the third division of exercises. The entire arterial system is pulsating in a way to send the blood through the lungs very swiftly. If one should stop all exercise suddenly at the close of this third division, the legitimate benefit would not be realized. One would not only fail to reap profitable results, but might seriously apprehend positive injury from violating *the law of rhythm in nature.* If a violent exercise is begun suddenly the danger is great, and it is equally great if ended suddenly. There are records of positive injury, and not a few cases of sudden death caused by such exercises. One might naturally ask, if it would not be better to avoid vigorous exercise altogether. The proper and simplest answer to this question is, that the structure of the human system provides for such exercise, and therefore it ought to be taken. Without it reserve power could not be stored up in the organism. Science has so abundantly

demonstrated this truth that all doubts are removed from the minds of those who have given the subject any serious study. But while vigorous exercise must be taken, it is equally necessary that suitable exercises for *harmonizing the force thus generated* should be practised also. The exercises described in this fourth division are for the purpose of meeting that requirement. By them the dynamic force, which has been developed by the vigorous exercises, is transmuted into harmony of action, which is as needful to the perpetuity of all organisms as is dynamic force itself. One of the most wonderful principles of all nature's organisms and systems, is the perfect harmony with which they move. This is observable all through the planetary systems and up through the vegetable and animal organisms.

Harmony is a positive energy and not a negative quality. This is why I have said that the dynamic force developed by vigorous exercises must be transmuted into harmony. The object is not "to slow down," i. e., to reduce a force in the body, but to transmute it into something abiding.

If you allow vigorous exercise to become less and less vigorous, until the forces of the body are quiet as they were previous to taking the exercise, reaction and prostration follow. The effect of exercises taken

FIGURE 32.

FIGURE 33.

in this manner tends toward weakness rather than strength. It is similar to the reaction consequent upon taking alcoholic or narcotic stimulants, except for the lingering poison of these stimulants.

An immediate and entire change of exercise is required in the form of

HARMONIZING MOVEMENTS

which are found in the fourth division. A hint of this principle may be found in Homer's writings, where he describes the Greek warriors as entering upon athletic games when the battles with the Trojans are suspended but for a day. One might think that after such bloody conflicts they would rest; but they knew too much for that even at so early a period of their history. The Greek generals would not suffer such an enervating and demoralizing influence to be exerted, in view of the anticipated struggles of succeeding days.

By the exercises of this fourth division the nervous system is refreshed and invigorated. The nerves furnish the natural stimulant for muscular activity, and this stimulant is acting upon the muscles at the close of the severe exercises of the third division, and should now be returned through a higher order of exercise, a semi-psychological form, to the brain that furnished it.

The brain and nerves constitute the battery for all energy, whether physical or mental.

The brain possesses two classes of centres, the vital and the mental; the energy of the former is conveyed through the mechanism of the entire body to the latter.

All the exercises of this division are given in the definite movements which express through the body the healthy attitudes of the mind. By this method the health of the mind is transmuted into health of body.

The four healthy attitudes of the mind could easily be defined in statements, and I would give them here, only it would require a very lengthy chapter to explain them, and, furthermore, they logically belong to another department of the college studies.

I have simply introduced the thought here, for the purpose of suggesting the value of applying to physical culture some most important discoveries in nature, viz., the *correlation of forces and conservation of energy.* In the kingdom of nature no energy is ever lost, and it never ceases to operate. When it seems otherwise, it is because it is transmuted into some other mode of motion.

If we would derive the highest benefit from physical culture, we must have some definite method of conserving force, when it is developed.

FIGURE 34.

FIGURE 35.

No other system of physical culture, so far as my knowledge extends, has made obedience to this principle one of its chief corner-stones. In fact, no one has definitely mentioned it. Some have arranged to gradually increase the vigor of the exercise they give, and then to gradually decrease it to the point of rest. This practice is good so far as it goes, but it does not meet this demand revealed in the correlation of forces and conservation of energy.

In this demand the requirement is not to work faster and then slower, but, through a different exercise, to transmute a force developed by vigorous exercise back to the brain and nerve centres, to be stored up in healthier nerve tissues.

It is easy to develop and waste power, but it is not an easy matter to conserve it. Yet I am satisfied there is a way, and that way is to *transmute pure physical energy into psychological force*, not in some accidental or fanciful manner, but through definite forms of psycho-physiological expression.

ÆSTHETIC VALUE.

One experiences pleasure in listening to a melody, but how much deeper and richer the joy while listening to the full harmony with it. The chief pleasure that

a melody produces is the harmony that it suggests, and the difference in the beauty of various melodies comes from difference in the wealth of the harmonies that are unconsciously awakened in the mind while singing or listening to the melodies.

The poet says :

> " All are needed by each one,
> Nothing is fair or good alone.
> I thought the sparrow's note from heaven,
> Singing at dawn on the alder bough;
> I brought him home, in his nest at even ;
> He sings the song, but it pleases not now,
> For I did not bring home the river and sky;
> He sang to my ear, — they sang to my eye."

After the poet has tested those manifestations in nature and human experience which give the highest pleasure to the imagination, and has found that nothing *continues* to give any sense of beauty when taken by itself, he concludes that beauty is a cheat, and that he will have nothing to do with it; that henceforth he will utterly ignore beauty, and seek truth to the exclusion of beauty.

But, just as the poet arrives at this conclusion, the thought is revealed to him that the reason he has been so sadly disappointed is because he has not obeyed the law of beauty. He now discovers that to get the good

FIGURE 36.

FIGURE 37.

in beauty, and thereby obtain from it what another poet declares, who says, "A thing of beauty is a joy forever," he must not look for beauty in any separate object, but in the *relationship* that objects sustain to each other.

Beauty grows out of the contemplation of truth, and that truth is the natural *relationship* of objects in nature, and not the objects themselves. No single object considered by itself is beautiful, nor does it give pleasure to the imagination in any way.

The poet continues:

"Then I said, 'I covet truth;
Beauty is unripe childhood's cheat;
I leave it behind with the games of youth.'
As I spoke, beneath my feet
The ground-pine curled its pretty wreath,
Running over the club-moss burrs;
I inhaled the violet's breath;
Around me stood the oaks and firs;
Pine cones and acorns lay on the ground;
Over me soared the eternal sky,
Full of light and of deity:
Again I saw, again I heard,
The rolling river, the morning bird;
Beauty through my senses stole;
I yielded myself to the perfect whole."

THE RELATIONSHIP OF PARTS.

That which distinguishes Greek art from all other, and gives it its immortality, rendering endeavor to equal it a hopeless task, is the exact relationship of all its parts. Greek sculpture does not excel in perfection of detail Michael Angelo's, but no other artists have ever developed to so high a degree of perfection the relationship of the parts. Other artists have sculptured a leg and an arm, a hand and a foot, a head and a breast with as much accuracy and finish as have the Greeks. The difference is in presenting the relation these parts sustain to each other.

In looking at Greek art the soul is satisfied without asking why. The satisfaction comes from the revelation of *feeling* given by the relationship of parts. The reason of this unequalled skill proceeds, doubtless, from two causes: their great love of the human form, amounting almost, if not quite, to worship; and their opportunity of observing the nude person while it was in action. They were brought up in schools where the human form was an object-lesson in all their studies. Their gymnastic exercises were taken when divested of all clothing, and it became the aspiration of the artist to fix in imperishable form the relation

that the different parts of the person sustained to each other when in free exercise.

Attempts have recently been made to accomplish the same end by photography, and with some degree of success; but the result comes far short of that which the experienced eye of the Greek, that eye which had been trained for a thousand years, could perceive, and which Greek skill could reproduce. Great possibilities of, and strong tendencies toward, accurate observation were transmitted from generation to generation, increasing in excellence by the contributions from the improvements developed in each succeeding age, until the Greek of the Phidian period not only felt a hitherto unknown enthusiasm for beauty of form, but he had eyes that could see finer relationships than had ever been previously discovered.

This high revelation in art, which reached its climax in the Phidian period, was not due alone to the skill of the artist. The Greeks were at that time the most beautiful people, both in form and movement, that have ever existed. The systematic physical culture by which they had been educated through a period of many hundreds of years, had cultivated their persons to stand and move in exact obedience to the laws of the *relationship of parts*. For a model, the artist had

perfection in the forms of men and women around him.

The exercises in this fourth division are for the particular purpose of educating and developing the relationship of the different parts of the physical person. While there is some value in moving a part by itself, the essential benefit to be emphasized comes from moving it in relation to other parts.

We must now give some attention to

THE PHYSIOLOGY OF THIS RELATIONSHIP.

The most eminent physiologist of this century has said: "Now, it is plain that this grouping of the muscular movements arises out of its *felt* conformity to the end in view, and that it is regulated by the guiding sensations which indicate to us the progression and balance of the body."

Delsarte also, has said many new, good, true and valuable things in statements concerning laws of unity in art. His criterion of unity, which he calls the law of opposition, is true, and it is a helpful guide in the study of this subject.

The different parts of the body aid each other in the attainment of any desired end. Furthermore, it is plain that, for economic purposes, the parts always

move in opposite directions. When the arm rises the head inclines toward it; when the arm moves toward the right the head moves toward the left, and *vice versa*. When one arm moves toward the left the other moves toward the right, and *vice versa*, except when both arms are used as one; also the left leg opposes in attitude and movement the opposite leg, the left arm, and the head. This law is equally applicable to all the other parts not here named. It is manifested in every person, in the ratio of the grace of his movements. In the awkward person this law is violated, and the violation is the secret of his awkwardness.

In Greek statuary obedience to this law is perfect. The reason is not in the intention of the sculptor, for there is no evidence that the Greeks knew this as a law of nature. It appears in their art, because they represented persons as they saw them, and their physical education had developed a race possessing ideal forms.

The judgment can never express this unity by any conscious dictation, for unity of movement proceeds from feeling. There is a natural tendency in the physical system toward harmony of movement and posture. It is our aim to educate this tendency. Unity secured by obedience to the law of opposition is not an invention of art, but a physiological method

of nature for the attainment of facility in accomplishing desired ends.

We will now inquire definitely what the physiological laws are which induce this harmony.

First, —

MUSCULAR SENSE TO THE END OF MAINTAINING EQUILIBRIUM.

It is a great attainment in physical culture when a child has learned to stand alone. He does not learn to stand by means of what may strictly be called knowledge. His desire to stand is psychological, and so is his determination; but the method of success is physiological, for it is muscular sense. The child has sufficient strength to stand some time before he succeeds in doing so. His great difficulty consists in maintaining his equilibrium, and it takes time for the muscular sense to sufficiently develop to become an exciting cause of muscular contraction in a way to throw out this or that foot necessary to balance the body around its centre of gravity. At last he stands, though he knows not how, for the muscular sense has guided the contraction of the different groups of muscles in such opposition to each other as establishes perfect equipoise.

Next, — The child will walk. This is an added task, in which he will meet the same difficulty that first stood in the way of his being able to stand. Finally the muscular sense becomes sufficiently developed to cause the different groups of muscles to contract in a manner to sustain the body in an erect position, in spite of changing its centre of gravity with each added step.

In process of time the arm renders assistance by swinging with the opposite leg.

From this beginning, development should go on until all the groups of muscles in the human system obey the universal law. Then, and not till then, does the body become literally the servant of the soul, obeying its mandates through a law of its own structure, without requiring the interference of care and judgment.

Second, —

STIMULATION RECEIVED BY OPPOSING MUSCLES THROUGH RESISTANCE.

When a group of muscles is exercised, its tendency is to move the bones, to which the several muscles are attached, from their position. It would succeed in doing so if another group did not instantly contract to

prevent. The latter group of muscles is stimulated by the impulse of motion imparted by the former group to that part of the osseous system to which the latter is attached.

Take a muscle from the body of an animal recently killed, and fasten one end to the side of a wall, allowing the other end to hang free, apply stimuli and it will shorten somewhat; then attach a given weight to the free end and it will be seen that again the muscle immediately shortens. In the living body the nerves stimulate the muscles, causing them to contract. While that is the main cause of muscular contraction, there is another, though less positive cause, viz., the resistance of the action of one group of muscles to another group, which acts upon the same principle as that shown in the illustration of fastening a weight to a liberated muscle. It is not that one group of muscles is attached to another and opposing group, but two opposing groups are attached by means of tendons to the same bone; therefore, the shortening of muscles on the one side, which tends to move the bone, causes the opposing group to contract, and thereby moves the opposing member in an opposite direction.

A third cause of opposite movements which result in harmony of action, is the

NERVOUS SYMPATHY WHICH EXISTS THROUGHOUT ALL PARTS OF THE SYSTEM.

Figuratively speaking, there is a watchfulness on the part of the nerves, for the purpose of discovering the need of action, and a readiness to respond to every such call. The nerves not only furnish the body with power to act, but they exercise a care in preventing any unnecessary expenditure of force. Much more work can be accomplished by the body, and with less exhaustion, if the parts work harmoniously. The tendency of the nervous system is to cause the body to accomplish the most with a given degree of strength; also to preserve the body from unnecessary friction.

FURTHER DIRECTIONS FOR PRACTISING EXERCISES IN FOURTH DIVISION.

That the different parts of the person may move in a manner to obey the law of opposition, which secures harmony, the individual should stand elastically, in a buoyant and expectant attitude, for the slightest resistance on his part, through indifference or lack of concentration, will prevent proper muscular response

in the different agents. But if he stands in this expectant condition, and moves the arms in the way described, it will be but a short time before he will notice that the head begins to move slightly in an opposite direction from that in which his arm is moving. After sufficient practice, other parts of the body will also respond in undulations which describe beautiful curves. The general effect upon all parts of the body is to cause an expression of sympathetic life in beautiful repose.

There is a poetic beauty in the movements of this fourth division, which is very manifest when a number of persons take the exercises together, with a musical accompaniment.

MUSCLES INVOLVED.

I shall not attempt to name the muscles employed in these exercises, for it is not the purpose of the exercises of this division to develop special muscles, but to give the movements of all muscles a harmonious relationship. This much may be said, however, that the movements of the fourth division tend to give fulness and roundness to all parts of the form, especially to the neck, chest, and arms.

SUGGESTIONS

FOR SECURING HEALTH AND LONGEVITY.

A WORK on physical culture should treat upon what may properly be termed the habitual conduct of life regarding health.

Health is developed and preserved more by right daily habits concerning those things which are called the common necessities of life, than by any extraordinary efforts. In self-culture each person is obliged to begin with what he finds himself to be, and do the best he can with the material furnished.

One eminent thinker and writer has said "If you are to properly educate a man, you must begin with him two hundred years before he is born." We cannot begin with ourselves two hundred years before birth, nor even at birth. We cannot begin until early childhood is past. Most of us do not begin to think

much about improving our physical powers until we have become men and women. Then we learn from our failures that we need much more power of body than we possess, to enable us to compete successfully for the prizes which are the legitimate fruit of endeavor.

As we begin to realize our deficiencies, the much discussed law of heredity looms darkly before us; sometimes to the extent of shutting out courage and hope. The more desponding temperaments hunt up the weaknesses of their ancestors and build mountains in their pathway of progress. There are laws of heredity, and we should study them and stand in awe of them lest we organize the penalties of violated laws into the physical structure of generations to come.

But while we study and practise obedience, for the sake of generations yet unborn, for ourselves we should look, not backward to the grapes that set our fathers' teeth on edge, but to the possibilities with which we are endowed.

If one born with a very moderate degree of robust tendency should begin in youth to obey the laws of health wisely and persistently he would, when reaching middle life, be much stronger than the average of those born with good constitutions.

Many of those who, by their Herculean labors, have written their names the most indelibly on the records

of immortal fame, were noted for feebleness during childhood.

If one would become strong and enduring he must exercise the spirit of heroism directed toward health. When one has firmly resolved to become strong, he has taken the most important step towards securing that incomparable prize, health. The laws of nature say "Obey us and live, disobey us and die." Health is the price of constant obedience, and is within the reach of the majority.

Every human being has descended from two distinct lines of ancestry, the human and the Divine. The human line is but the condition through which the race is perpetuated, not the cause. The cause lies deeper than human heredity; it lies in the Divine nature. We are the children of the race; on this side comes limitation, taints of disease, tendencies to particular weaknesses. We are also the children of God; on that side lies health, strength and longevity. If, in looking up the ancestral stream, you find weakness and disease on the human side, rally with all your will, perseverance and wisdom on your relation to the Universal, the Infinite, which gives each generation the opportunity of rising far above the generations that have gone before.

Standing squarely upon the conviction that we

possess the hereditary hold on the fountain of unfailing health, let us begin to inquire concerning the laws that bring the highest possibilities and the greatest longevity. It is desirable to live to a great age if we make the most of life's opportunities. It was the promised reward of obedience, in ancient time, that the chosen should live long in the land the Lord their God should give them. That promise holds to-day. Long life is the result of obedience.

LONGEVITY.

Man by transgression has shortened the period of life's duration, in the great majority of cases, to three score years and ten; in fact to fewer years.

Still, even in modern times, some have lived twice as long as the so-called "allotted time." The thought that they are old and must soon pass away hastens the end of life in the aged. Some keep this thought almost constantly before them and thereby hasten the decrepitudes of age and actually bring on premature old age and death.

It is not well to say to one's self "I cannot, in all probability, live to be more than so old." Think of living and doing, of being healthy and happy, and

making those around you so, and leave the time of the final event out of your personal arithmetic.

That life's duration may seem to stretch and prolong in a way to make us feel young (which is a most desirable feeling in all), I will insert a few notes which show that it is possible for some to attain a great age; hoping, thereby, to inspire courage in those who are thinking themselves too old to engage much longer in life's duties.

My friend, keep on the harness as long as possible; many years may be yours. I have seen some, who were seventy years old, take a new lease of life and a deep draught of the elixir of health by adopting new methods of exercise and diet.

Malte Brun says, "It was in Punjaub and other elevated districts that the ancients collected numerous examples of Indian longevity. The Cyrni and the subjects of Prince Musicanus, often lived to the age of one hundred and thirty or two hundred years."

"Faria says an inhabitant of Diu lived to the age of three hundred years."

"Captain Riley, in the Journal of his Shipwreck, mentions that he was told by Sidi Hamet, of an Arab in the great African Desert who was nearly three hundred years old; and he adds 'I am fully of the opinion that a great many Arabs in this great expanse

of desert actually live to the age of two hundred years or more."

"According to Pliny, in the year 76 of the Christian Era, from a taxing of Vespasian it was estimated that between the Apennines and the Po, there were living one hundred and twenty-four persons one hundred years old or upwards; viz. fifty-four of one hundred years; fifty-seven of one hundred and ten years; two of one hundred and twenty-five years; four of one hundred and thirty; four of one hundred and thirty-five years; and three of one hundred and forty. Besides these, Parma had five, whereof three had fulfilled one hundred and twenty, and two one hundred and thirty; Brussels had one of one hundred and twenty-five; Placentia one of one hundred and thirty-one; Faventia one woman of one hundred and thirty-two; a certain town then called Velleiacium, situated in the hills about Placentia, afforded ten, whereof six fulfilled one hundred and ten years of age, four one hundred and twenty; lastly Rimino, one of one hundred and fifty years, whose name was Marcus Apponius."

"J. E. Worcester, LL. D., gives a list of ninety-eight persons in New Hampshire, with the date of their deaths, which occurred within the period of ninety-three years, ending in 1824, all of whom were

one hundred or more years old, besides six others, the dates of whose death were unknown, the eldest of whom was one hundred and twenty. Dr. Worcester gives a table, beginning in 1808 and ending in 1821, exhibiting a list of one hundred and thirty-two persons in the United States who had attained the age of one hundred and ten years or upwards; three at one hundred and thirty, three at one hundred and thirty-four; one at one hundred and thirty-five; two at one hundred and thirty-six; one at one hundred and thirty-seven; one at one hundred and forty-two; one at one hundred and forty-three; one at one hundred and fifty years of age.

"In the beginning of the year 1858, there were in the New England States, four clergymen, all educated at Dartmouth College, each of whom was one hundred years old."

Dr. Mussey, formerly a professor of anatomy and surgery at Dartmouth College, says that John Gilley, born in the county of Cork, Ireland, 1690, died at Augusta, Me., July, 1813, aged one hundred and twenty-four. "I saw him after sunset of a cold evening in December at the age of about one hundred and eighteen. At that time he took the whole care of the cattle at his barn, and cut all the wood for the fire in his house. He lived a bachelor till he was between seventy and

eighty, when he was married to a girl of eighteen. They had eight children who had gone out into the world 'to seek their fortune,' leaving the old folks to take care of the homestead."

"Henry Francisco, born in France, died near Whitehall, N. Y., in October, 1824, in his one hundred and thirty-fifth year."

"William Scoby, a native of Ireland, died in Londonderry, N. H., at the age of one hundred and ten years. When he was one hundred years of age he travelled on foot from Londonderry to Portsmouth, more than thirty-five miles, in one day."

"Robert Metlin died in 1787 at the age of one hundred and fifteen. He lived for some time at Portsmouth, and followed the occupation of a baker. He was a great pedestrian. He usually bought his flour in Boston and travelled thither on foot. He performed the journey in a day, the distance being then about sixty-six miles, made his purchases, put his flour on board a coaster, and returned home the next day. He was eighty years of age the last time he performed this journey. At that time this was thought an extraordinary day's journey for a horse. The stage-coaches required the greater part of two days. Col. Atkinson with a strong horse and a very light sulky, once accomplished it in a day. He set out

early in the morning, and before he reached Greenland overtook Metlin, and inquired where he was bound. Metlin answered, to Boston. Atkinson asked if he ever expected to reach there, and drove on. Atkinson stopped at Greenland, and Metlin passed him; they alternately passed each other at every stage on the road, and crossed Charlestown ferry in the same boat before sunset."

"The Hon. Mrs. Watkins of Glamorganshire, visited London at the age of one hundred and ten, the last year of her life, to witness one of the performances of Mrs. Siddons. She ascended the many flights of steps, which lead to the whispering dome of St. Paul's. The last forty years of her life, Mrs. W. is said to have lived exclusively on potatoes."

"Thomas Parr, of Shropshire (England), died in 1636, aged one hundred and fifty-two years and nine months. He was twice married; the first time at eighty, the second time at one hundred and twenty years; he had offspring by each marriage."

"Henry Jenkins of Yorkshire, England, lived to be eight score and nine, or one hundred and sixty-nine years of age."

"Peter Zarten, near Temesvar, in Hungary, died January 5, 1724, at the age of one hundred and eighty-five."

"John Rovin and his wife, of Temesvar, Hungary, died in 1741, he in his one hundred and seventy-second year, she in her one hundred and sixty-fourth, having lived together, man and wife, one hundred and forty-seven years."

"There were in the United States, in 1850, two thousand, five hundred and fifty-five persons over one hundred years of age," which would make about one person in every nine thousand.

I have not given this record of longevity merely for the sake of imparting statistical information, but to show the possibility there is in the human constitution for living vastly longer than the ordinary limit of mortal existence. When a person arrives at the age of eighty years we think it certain that the end is nearly reached; yet one person, I have here mentioned, lived one hundred and five years longer than that. If one has lived so long, another may.

Those who have lived to a great age have not always been persons of great strength or of especially uniform health. The only individual I have ever been personally acquainted with who lived to be nearly one hundred years of age, was Rev. Roland Hewett, who died in Northfield, Vermont, in November, 1886, well advanced in his ninety-ninth year. He told me he

had never been what was termed a very healthy man, and had had several severe illnesses. But he never knew what people meant when they sometimes said, "the pains and aches of old age." It could not be said of him that great longevity was his inheritance from his parents; for his father died at the age of sixty-nine and his mother died when she was about thirty years old.

Some say, "I do not wish to live to be old." They mean by it, they do not wish to live many years after becoming enfeebled with age. The persons who attained such very great age did not live after they were especially enfeebled. Feebleness does not necessarily belong to age. Its presence depends upon the life the old person has led. It appears from accounts given of many persons who have lived to such advanced periods that they continued possessed of the powers of enjoyment up to the very last.

CLIMATE.

Climate should be considered as one of the conditions of health and longevity. There is no doubt that climate exerts an influence upon the health, and that some climates are more favorable to health and longevity than are others. As a rule people who

live in a mild climate live to a greater age and are larger and stronger than those who live in extremely cold regions. Extreme climates, either hot or cold, are not thought to be the most congenial to health and strength. Those living in extremely northern regions do not grow to nearly the size of the natives of more mild climates. The same criterion can hardly be applied to the hot climate; for the natives of the latter grow to full size and frequently live to a great age. The temperate zone, however, is considered most favorable to the highest development of mind and body; yet history proves that this is far from being a rule without an exception.

One should study the climate in which he resides, and properly relate himself to its demands in his diet, clothing, exercise and dwelling. Man can so fit himself to nearly all climates as to live healthfully in them.

The climate of New England has received much criticism for being so conducive to catarrh, consumption and pneumonia. But we must remember that when the natives of the Atlantic coast were discovered by the white race, these diseases were unknown here. It was not because of anything in the constitution of the North American Indian that indemnified him against these diseases; for since he

has become "partially civilized" his greatest foe is found to be consumption. It is bad food, drink, clothing, houses and habits that render the climate in this part of the country unkind.

In enumerating the conditions of health we will mention, first

PROPER VENTILATION.

When the air has been breathed it becomes not only uninvigorating, but deadly in its effects.

Our houses, as a general rule, are so constructed that either they fail to protect the inmates from the cold, chilling currents of air, or allow no fresh air to pass through the rooms. In either case health is impaired and life endangered.

Allowing a cold current of air to continue blowing upon any part of the person is liable to produce a congestion which will result in a form of disease that is in accordance with the nature of the part and the temperament and tendencies of the individual. On the other hand, habitually occupying rooms that do not admit a free passage of air, and where much of the air is breathed over many times, poisons the blood, enervates the entire system and renders the person susceptible to any and every form of disease.

Windows are not proper ventilators in the winter season. By opening the window a great deal of heat is lost from the room, therefore there is added expense of fuel; also a sudden stream of cold air must fall upon some part of the room, so that one sitting near the window feels the damaging chill, and those farther away receive it upon the lower extremities, chilling them and driving too much blood to the head, already oppressed with the heat. The house should be made in every part to shut out cold in winter and heat in summer. For the winter season external windows should be added.

Even if a person lives in a hired house, and is to stay there but one winter, it would pay him to put on these outside windows. The fuel saved the first winter would, as a rule, pay for the cost of the windows; besides, they would prevent great liability to sickness, for there is no more effectual way of taking cold than by sitting near a window which has but one thickness of glass between the person and the cold outside air. The warm air of the room continually strikes against the cold glass. In condensing, it becomes heavier, and consequently falls from the window in such a steady current that in a cold day it may be felt like a chilling blast coming from the outside. People in consequence of feeling this draft

think the cold air is coming in around the window and look for some means of more tightly fitting the window. Instead of this an outside window should be added. There should be an open fireplace in every room, even if the house is so heated that no fire is needed; then the fresh air should be conducted from the outside in passages that will carry it from near the base of the outer wall of the house to the ceiling, then conveyed by a passage made for the purpose to the centre of the room, where it should be allowed to fall in small jets through a large centre piece. By thus conducting the air in close passages up through the walls of the dwelling, no hot air will escape; for hot air, being lighter than cold, will not fall. The chimney, being warm, will draw the cold air from the floor, thus allowing the air from the outside of the house to pass into the room and fall into the overheated air at the top of it, and become warmed by the surplus heat.

In a well warmed room there is always, near the ceiling, a high degree of heat which, could it be utilized, would warm a sufficient amount of cold air with which to ventilate the room. Some think a room is sufficiently ventilated if fresh air is brought from the outside through the furnace. If there is an open fireplace in all the rooms, this theory is

true; but the air when heated by the furnace becomes so dry that it absorbs the moisture from the mucous membrane of the nose, mouth, bronchial tubes and the air cells, to an alarming extent. Vessels containing water are usually found in hot air furnaces, but they are so placed that the evaporation is not sufficient to properly moisten the air.

The subject of ventilation should command serious attention. Few persons can govern the ventilating mechanism of the rooms they occupy, and each one is called upon to manage the means of obtaining fresh air in his own room the best he can. Let him, therefore, exercise his ingenuity in so changing the air as to give him a healthy atmosphere to breathe, and at the same time receive no chill. *Better poor air than a chill.*

LIGHT.

The influence of sunlight as a health-producing agent is by no means to be overlooked. Sir James Willie, physician to the emperors Alexander and Nicholas of Russia, reports that in the hospital where sunlight was excluded, the death rate was four times as great as in one into which the sunlight penetrated.

I have known persons who had been considered

hopeless invalids to cure themselves by lying in the sunlight, allowing the rays to fall directly upon the entire body, except the eyes, for several hours each day. Dr. Kane wrote during his exploring expedition: "The day is beginning to glow with the approaching sun. The south at noon, has almost an orange tinge. In ten days his direct rays will reach our hilltops; and in a week after he will be dispensing his blessed medicine among our sufferers. The coming sun will open appliances of moral help to the sick, and give energy to hygienic resorts which I am arranging at this moment. For the last ten days we have been watching the growing warmth of the landscape as it emerged from the buried shadow through all the stages of distinctness of an India ink washing, step by step, into the sharp, bold definition of a desolate harbor scene. We have marked every dash of color which the great Painter, in His benevolence, vouchsafed us; and now the empurpled hues, clear, unmistakable; the spreading lake, the flickering yellow, peering at all these poor wretches! Everywhere superlative lustre and unspeakable glory."

Let us be careful how we exclude this friend from our houses or his kind rays from our bodies.

The chief office of the skin is not to cover the body. The skin is an organ involving most important functions. It must eliminate many ounces of effete matter from the body daily, or much disease-engendering material is left in the blood, and the lungs and other organs are overtaxed in adding to their own duties the work which should be performed by the skin. The pores of the skin, through which should escape so much of the impurities of the body, frequently become clogged. At other times they become too active, and an unnatural amount of perspiration takes place.

Proper bathing will prevent both of these difficulties, by cleansing the pores and keeping them free, and by giving to them due tone to sustain their contractile power. It is difficult to prescribe any exact rules for bathing; therefore we will suggest a few general directions.

Do not take a plunge bath either hot or cold within two hours of a meal.

Never allow a chill after bathing.

If a chill follow a bath, injury has been done.

The laws of health require that one should bathe

daily. The kind of bath depends much upon the general condition of the person.

A few are benefited by a plunge into cold water, but they are persons of great vital resources.

A sponge bath, taken as rapidly as possible, followed by quickly wiping the person with one towel, then a severe rubbing with a fresh towel, is the safest and, ordinarily, the best form of bath. More than one towel should always be used, or a sufficient glow of the skin will not be obtained.

TIME FOR BATHING.

The best time for bathing is immediately on rising, the next best is at the time of retiring. For invalids, eleven o'clock in the forenoon is the best time.

EXERCISE, WHEN AND HOW MUCH.

The exercises described in this work should be taken in their consecutive order, for one division of exercises prepares the body for the following division. One division assists all the others in producing the proper physiological effect, and therefore they should all be taken in their logical order, not a part of them at one time and the remainder at some future time.

THE MOST FITTING TIME AT WHICH TO TAKE THE EXERCISES.

A healthy person can take them with benefit regardless of the nearness to meal-time; but those in delicate health should take some care not to exercise within from one-half hour to an hour of their meals.

THE NUMBER OF TIMES IN THE DAY A PERSON SHOULD TAKE THE EXERCISES.

The exact number of times a person should go through the exercises during the day cannot be made an unvarying rule because there are so many things to be taken into consideration in each individual case. A person who is in reasonably good health, and is taking no other exercise, should take the exercises carefully six times a day. Those who are exercising in other ways may take them twice a day. Every one should take them on retiring at night, no matter how fatigued, for the purpose of equalizing the circulation previous to sleeping. If one goes to sleep after pursuing some line of work, either physical or mental, the blood continues to circulate unequally through

the system, thus preventing sleep from giving entire recuperation.

THE NUMBER OF HOURS OF SLEEP REQUIRED.

It is impossible to prescribe a rule for the number of hours out of every twenty-four that one should sleep. Persons of some temperaments require more sleep than persons of other temperaments. The slow, bilious temperament does not admit of as rapid recuperation as is wrought in one of sanguine temperament. Then again, at one period of life a person needs more sleep than at another period. Children and aged people need more sleep than persons in middle life. Again, while following one pursuit an individual may require more sleep than when following some other. Jeremy Taylor declares that three hours of sleep out of every twenty-four are sufficient. Lord Coke says seven hours are the required number and Sir William Jones agrees with him. Sir John Sinclair mentions eight hours. And so one might quote an endless number of different authorities without coming to any fixed rule.

Many persons are much troubled with wakefulness in the night. This may be owing to different causes, such as improper nourishment, insufficient nourishment

or overeating. It may be in consequence of irregular habits in regard to rest. Then there are some persons who are incapable of sustaining exertion for long periods of time; and such are sometimes wakeful a portion of the night and are obliged to sleep more or less in the daytime. They are of elastic but not of enduring temperaments. Then, again, some are wakeful a portion of every night from trying to sleep more than is necessary.

John Wesley gives in his own experience an interesting illustration of this. He writes "If one desires to know exactly what quantity of sleep his own situation requires, he may very easily make the experiment which I made about sixty years ago. I then waked about twelve or one and lay awake for some time. I readily concluded that this arose from my lying in bed longer than nature required. To be satisfied I procured an alarm which waked me the next morning at seven, nearly an hour earlier than I rose before; yet I lay awake again at night. The second morning I rose at six, but notwithstanding this I lay awake the second night. The third morning I rose at five; but nevertheless I lay awake the third night. The fourth morning I rose at four (as by the grace of God I have done ever since) and lay awake no more. And I do not lie awake, taking the year

round, a quarter of an hour together in a month. By the same experiment (rising earlier and earlier every morning) may every one find how much sleep he really wants."

Without doubt the rule lies between five and eight hours, and at or somewhere between these two extremes, each person will find his needed amount of sleep.

Some persons form the habit of sleeping too much, thereby enervating the forces of the system. I would like, however, to give a word of caution to parents in regard to treatment of children in this matter. The child never feels like sleeping any more than it needs to. Many children have been wholly or partially dwarfed by being deprived of sufficient sleep. *Let the child sleep, do not wake him.* One person's experience is not a rule for another.

THE BEST TIME FOR SLEEP.

The best time for sleep is between the hours of nine at night and five in the morning.

The rule that John Wesley gives has a truth in it worth considering; but we must take into consideration that John Wesley had such habitual command of himself in every way that it was comparatively easy for

him to ascertain a rule for himself in regard to the amount of sleep he required. It may be more difficult for persons who do not live in such a consistent manner to determine the quantity of sleep they need.

John Wesley rose at four, and for sixty years enjoyed the glories of morning. Many have written of sunsets, few of sunrises. Without doubt the reason is that few writers are in the habit of seeing nature in the early morning. As indescribably beautiful as sunset is, it is no more inspiring to the imagination of the poet than are the splendors of sunrise. Then, in addition to the "beauty of early morn," there is a physical exhilaration experienced by the early riser entirely unknown to those who indulge in the morning nap. Notwithstanding that "early to bed and early to rise" should be insisted upon as the ideal standard, and that, other things being equal, life yields more to those who obey it, there are some so unfortunately organized that it is doubtful if, under any circumstances, they could obtain their needful sleep before five in the morning. I have known two children who furnished excellent illustrations of the fact that, while most people are very much healthier in following the rule of getting all their sleep between nine at night and five in the morning, there are some who are wholly unable to do

this. These two children were always, during childhood, under the same influences, yet one was awake as early as five and always asleep at seven at night, while the other could not go to sleep early nor rise early. The parents tried every expedient in their power to correct the habit of the one who slept late, but with no success whatever. Feebleness and even positive illness followed every attempt at changing her habit. When this child grew to womanhood she used every means to create a change in herself in this respect, but with no good results.

While nature has provided general rules, let us be careful in the treatment of our children that we do not attempt to make what is a general rule apply to every individual case.

CLOTHING.

We shall in this place consider the matter of clothing in regard to temperature, having elsewhere spoken of the necessity of the freedom it should allow in exercise.

I wish here to say only a word in regard to clothing being so worn as not to hinder the free exercise of all the muscles; and that word I wish to give to mothers and to all who have the care of small children. The

waists of little girls, in many instances, are prevented from developing to their full size by having the clothing so close as to be termed "a good fit." Nature always does the best she can under the circumstances. The lungs need free play for respiration, and nature makes great efforts to secure it for them when they are in any way restrained.

If there is the slightest restraint from the clothing being too close, the waist of the body will shrink from filling the waist of the garment that it may have full freedom to expand during inspiration. In making the waist of the garment care should be taken that room be left between the body and the garment for the utmost expansion of the body without the slightest restraint from the garment. While the dress is being fitted the child is quiet, and the breathing reposeful, but it must be remembered that when the child runs and plays, which is its right and necessary privilege, the respiration is greatly increased. So much is it increased that, though the garment is perfectly free while the child is in repose, it requires two inches more in the circumference of the waist for the added action of the lungs caused by vigorous exercise. Another way in which the child is sometimes injured is by the bad fashion of wearing too long clothing in early childhood. Whatever may be said in

favor or against the long skirts worn by women, and however tyrannously custom exerts her power in restraining the freedom of healthy exercise in the adult, a mother should, in spite of fashion, provide for the health of the little child for which she stands responsible.

About once in so many years it becomes the fashion to bestow the long skirt upon children. Then the fashion changes and the skirt extends no lower than the knees, which is its proper limit. Is it necessary that intelligent mothers should yield to the long skirt fashion, and thereby burden their little ones in a way that will prevent development of strength and grace? Mothers should think of what the law of God demands in the care of their children, and be sure they yield to the demand of fashion only so far as is consistent with the laws of nature. Mothers intend no wrong to their children in these respects, but they do not give sufficient thought to the subject. There are many mothers who would not for their lives violate one of the laws God wrote upon tablets of stone, who, through inexcusable ignorance and thoughtlessness, violate the laws He has written in the constitution of their children. One never knows what life and health extinguishing machines fashion may invent and impose upon society at any time. Our only safe-

guard in this respect is the knowledge and application of science in resisting the freaks of fashion. The legitimate use of clothing is to protect the body against such degrees of temperature as are uncongenial to its condition. A sufficient amount of clothing should be worn to prevent too great a loss of heat from the body. The amount of clothing required for this is largely determined by sensation. The best general rule for determining the quantity of clothing that should be worn is the amount required to secure comfort; for, generally speaking, *the point of comfort is the point of health.*

There are, however, a few exceptions to this rule. Sensation is not always a safe guide in the matter of clothing, because sensation is modified by use. A person may so accustom himself to wearing less clothing than health requires that, although he experiences some discomfort while forming the habit, the sensibilities adapt themselves to his habits after a time, and he *feels* comfortable, though not properly protected. If the body loses too much heat the blood is impoverished, the vital organs are weakened, and the system suffers from a diminution of power through all its parts. Another exception to the infallibility of sensation as a guide is in the case of wearing too much clothing during the warm season of the year.

By wearing too much clothing in warm weather or in warm rooms, the skin becomes weakened and morbidly sensitive to cool air. The skin is not only weakened by too much clothing, but the energy of the small arteries that supply the skin suffers a loss of tone in the muscular coating with which they are lined, and therefore they fail to convey the blood to the surface of the body whenever the temperature is lowered even in a small degree, and a chill and a cold are the consequences.

If one concludes he is wearing too much clothing he should leave it off very gradually, and commence to do so during the hottest weather, and should take great pains, morning and evening, to bathe in tepid or cold water, and rub the person with either a flesh brush or coarse towels. One should always take off all his clothing at night and expose the entire person to the air in the room; but the room should exhibit the mercury at not less than sixty-five degrees, unless the individual is healthy and used to such exposure. The skin needs to come in contact with fresh air daily. One should never wear a garment at night that has been worn during the day. Little children should be protected from the temperature that is near the floor which is always cooler than the air that is higher up in the room. I have found the

temperature in a room where the ceiling was only nine feet high, to vary forty degrees between ceiling and floor. This, of course, was in the coldest weather in the winter, for such a difference could not exist in the summer season. The mercury stood at eighty near the ceiling and at forty near the floor. Adults were comfortable, seated in the room with good winter garments on. But what was the condition of little children who were playing on the floor? Not long since, during a January morning, the mercury ranging within fifteen degrees of zero, I called at a friend's house where a little one, with naked legs, was playing on the floor. The child soon grew irritable and the mother wondered at it, saying, "I think the child feels cross during cold days because the electricity affects its nerves; for it is a very sensitively organized child, just like its mamma." I took up the child and found its legs so cold that they must have been in pain.

In these days, when scientific terms are household words, people frequently hunt up some very obscure and remote cause for disease instead of taking the pains to exercise a little common sense in discovering and removing causes that are right at hand and under their control.

Indolent minds seek for rules to guide them in all

matters of health, but no arbitrary rules can be given which will apply to every case that may arise; many valuable suggestions may be given, but no rule or suggestion should be allowed to take the place of constant watchfulness, thoughtfulness and care. I write, not to lay down rules, but with the hope of stimulating earnest thought on the subject of securing health by obeying its laws.

FOOD.

In discussing food, the first question that arises is in regard to the kind of food natural to man. This question touches primarily the much discussed subject of whether man is naturally a vegetable eater or whether he is carnivorous. Cuvier says, "fruits, roots and succulent parts of vegetables appear to be the natural food of man." To this view most scientific men, who have carefully investigated the subject, seem inclined; and I am fully persuaded that it is the correct view. But, while it is true that man is naturally a vegetable eater, it is also true that a large part of the human race lived for untold ages in regions where it was impossible to obtain subsistence from the vegetable kingdom alone, and were therefore compelled to resort to flesh eating.

All northern races have fed on a mixed diet for many thousands of years, until meat eating is become, to some extent, a second nature.

Many persons live and thrive on an exclusively vegetable diet. Others have tried to maintain health on such a diet but have miserably failed, and have been obliged to return to a mixed diet.

Were it not for the fact that a second nature has been induced by meat eating, I should at once and unreservedly advocate a strictly vegetable diet for all persons; and urge it on the ground that the races of men who exclude meat from their diet are the most robust and strong, and attain the highest degree of longevity. I have no doubt the time will come, but it must come by degrees, when meat will not be used. The laws of economy will induce vegetarianism. Humboldt declares, upon a careful estimate, that an acre of ground is capable of growing bananas in sufficient quantity to support fifty persons. It is well known that enough meat could not be supported on an acre to keep more than five persons. It will be long before the race will be compelled to exclude meat from principles of economy, and so gradual will be the change that no harm, but great good will come of it.

No rule can be established that will apply with equal benefit to all persons in regard to eating meat.

Let us say this, however, that if a vegetable diet has been tried by any person and it is found to agree with him, let it by all means be continued, for it is the ideal food. Langsdorf says, "The people of the Marquesas and Washington Islands excel in beauty and grandeur of form all the other South Sea islanders. Many of them might well be placed beside the most celebrated *chef d'œuvres* of antiquity and they would lose nothing by the comparison." They never eat any meat. Pausanias has told us that the early Greek athletes ate no meat.

After all has been said that can be said for vegetable diet and against meat, care and experiment should not be neglected while adopting an exclusively vegetable diet. No doubt, in most instances, milk together with fruit and grain would render meat entirely unnecessary. Prof. Mussey, from whose valuable work called, "Health, Its Friends and Its Foes," I have had occasion to make several quotations, says that some of the Arabs who range the great desert of Sahara are said to live on milk, and to attain a great age. "The Arabs who live in the desert subsist wholly on the milk of their camels. It is the milk of an animal that we call sacred and it causes long life. Those who live on nothing else have no sickness or diseases, and are particularly favored by heaven; but

only carry the same people off from the desert and let them live on bread, meat, and fruits, they then become subject to every kind of pain and sickness when they are young, and only live to the age of two zille and a half at the most (about one hundred years) while a great many die very young, and not one-tenth part of the men or women live to the age of one zille. Hamet assured Capt. Riley that it was very common to find Arabs on different parts of the desert nearly two hundred years old retaining all their faculties."

I have known several who, on account of very weak digestion, left off all kinds of food except bread and milk, and then enjoyed good health. I have in mind one at this moment, who has confined himself to bread and milk exclusively, or nearly so, for almost forty years, and is now living in good health at the age of eighty-seven years. Previous to adopting a diet of bread and milk he had been, for many years in feeble health, and suffered greatly from dyspepsia.

THE MOST NUTRITIOUS KINDS OF FOOD.

Our next inquiry is concerning the most nutritious kinds of food found ordinarily upon our tables. The great objections to pastry may be resolved into two:

First, that it is allowed to take the place of more nutritious food and thereby deprives the system of a sufficient amount of nourishment. Second, that pastry induces derangement of the stomach and fermentation in the blood. At best we should eat sparingly of those things that are put upon our tables merely because they are pleasing to the taste.

One ought to know something of the chemical elements contained in ordinary kinds of food. I will, therefore, give some statements contained in a valuable work written by Dr. Bellows: "The Philosophy of Eating," published by Houghton, Mifflin & Co.; I hope every student of physical culture will peruse this book. "It is a remarkable fact which shows the importance of connecting science with practice, that the deterioration in the quality of the diet in Dundee prison consisted in substituting molasses for milk; which had been previously used with oat-meal porridge and oat-meal cakes; molasses being entirely destitute of muscle-making material, while milk contains a full proportion of these important materials."

From study, observation and experience, I am led to place milk first in the rank of the most healthful articles of diet; notwithstanding the fact that so many people think it disagrees with them. Never take milk cold and never take it between meals,

and, if past experience shows that it causes any unpleasant symptoms commence with a very small quantity and gradually increase it. Also eat fruit with milk.

Wheat unbolted is the most nutritious of grains. Beef and lamb are the healthiest and most nutritious of the meats. Taking everything into consideration, it is better to have meat cooked "medium" than "rare."

When we say wheat unbolted makes the most healthy and nourishing bread, we do not mean the article that is usually found under the name of "graham." This was originally unbolted wheat, and was so intended by the reformer from whom it took its name, but there is so much adulteration of this article that it is better to purchase the wheat and have it ground to order. Bread and biscuit should be much better baked than they usually are in this country. The English bake their bread much more than we do here, and that is one reason why dyspepsia is less common in England. Again there should be no "shortening" whatever put into the mixture; for any fat cooked with meal or flour renders them more or less indigestible. One might ask why butter cooked in the bread is not as healthy as when spread upon the bread after it is cooked. Nature does not always gratify our curiosity by giving us the why. In

chemistry we can know little of the why, but must content ourselves with knowing what and how.

Some people cannot eat fat meat of any kind; such may indulge freely in butter or cream. Of all the oily substances cream is the healthiest. Without doubt it might often take the place of cod liver oil with benefit to the consumptive patient.

Of the vegetables, potatoes are the healthiest. "In 1840 some of the prisoners in the Glasgow bridewell were confined to a strict diet of potatoes; two pounds at breakfast, three pounds at dinner, one pound at supper, all *boiled*. At the beginning of the experiment eight were in good health, and two in indifferent health; at the end, the eight continued in good health and the two who had been in indifferent health had improved. There was an average gain of nearly three pounds and a half in the weight of the prisoners. All expressed themselves quite satisfied with this diet, and regretted the change back to the ordinary diet."

Fruit should be eaten freely at meal-time, never between meals. Apples are the best kind of fruit and oranges rank next in dietetic virtue. What I have said concerning apples and oranges may admit of exceptions in individual cases. Much also depends upon the quality of fruit.

A great variety of food is undesirable. Some stomachs are always craving a change of food. Such a stomach should be disciplined, for there is something abnormal in its condition. A change of food is required only when some element in it preponderates over others to the extent of loading the system with that one element. The change brings about a better balance between the elements.

QUANTITY OF FOOD NECESSARY.

Another much discussed principle in diet is quantity. Here again one must not attempt to be too exact, for no one is able by any scientific calculation to determine just how much food is required to sustain a man for a given period of time. A person may need more at one time than at another. Again, no two persons require precisely the same quantity. Nature has a way of her own by which she regulates the quantity to some extent through the appetite. Appetite is by no means an infallible guide, either in quantity or kind. It has been said "one had better eat too little than too much." The reverse of this is true. Let a person be sure of eating enough. This advice, however, applies more particularly to persons

of nervous tendencies than to persons of vital habits. The nervous, anxious person seldom eats as much as is good for him, while the person of more vital tendencies is liable, under favorable conditions, to eat too much. Again, the quantity of food should be regulated somewhat according to the amount of exercise taken.

NUMBER OF MEALS TO BE TAKEN IN A DAY.

The Germans at one period were in the habit of eating five good meals in a day. The North American Indian flourished on one when it was inconvenient to obtain more. A majority of people require three meals. Some persons, however, do much better with two meals a day. Let each person study his own needs.

FLAVOR OF FOOD.

A word should be said about flavor of food. That which one relishes, other things being equal, will be digested the most easily. But the relish is largely a matter of habit. An appetite for almost anything can be acquired. A person usually likes that best which he is in the habit of eating. "I would like it the way my mother used to make it" is a common remark;

though sometimes not agreeable to the present cook's ears.

Therefore, instead of being guided in the selection of food by what is most pleasant to the taste, educate the taste to enjoy that best which is most nourishing and healthful.

CONFECTIONERY.

Here an emphatic word should be spoken. Much is said against the dram shop and none too much; but a great deal ought to be said against the candy shop. Not that I would compare the two shops, for the evil of the former is so much greater than that caused by the latter that no comparison whatever can be made. Still the confectionery store is a positive injury to the community. Our children and young people are being seriously harmed by it.

There are so many evils growing out of the use of these sweets that there is no space in a work of this size in which to even name them.

That fermentation takes place in the blood in consequence of so much sweet is a demonstrated fact. Acidity follows, engendering countless evils, such as catarrh, sore throat, acid stomach, coughs, colds, stomach derangements, and general debility.

If parents would look into this evil their children would be taught better than to eat confectionery, though some friend "more tender than wise" should give it to them.

DRINK.

The kind of beverages one should use is a very important question. This is apparent when we consider the fact that a person requires several times the weight of water to sustain life and health that he does of solid food.

This is not intended as an exhaustive treatise upon any of the hygienic conditions, therefore I shall say but little on this subject, but hope I may be able to make some useful suggestions concerning what and how much to drink.

No one will question the statement that water is the proper beverage for all persons, whatever their condition. It is water only that can quench thirst, whatever may be mixed with it. One may mix elements of food or medicine or stimulants with water, for nourishment or cure, or to the end of producing happy-making sensations and emotions, yet, upon a moment's thought, all will acknowledge that it is water and water only that allays the parching cry of the body

for moisture. We will pause to say but a word concerning the mixture of any form of alcoholic spirits with the water. To say nothing of the danger of increasing the habit, and thereby entailing upon one's self all those evil consequences with which every one is theoretically acquainted, the spirit taken regularly in small quantities preserves tissue which retains dead materials in the place of new and fresh elements.

Chocolate and cocoa are harmless mixtures, and are about the only harmless elements that are fashionably used in beverages.

Tea is less harmful than coffee. Coffee is an excellent medicine, especially as an antidote for several poisons, because coffee itself is a poison. The suffering that comes from this medicine when used as a beverage cannot be estimated. Some preparations from wheat have been recently introduced that are not only harmless but very beneficial if used with meals. I would specially mention a preparation by Prof. John W. Clark. This preparation contains a large per cent of vitalized hypophosphites, which nourish the brain nerves and bones. I hope the time is not far distant when this new preparation from wheat will so far take the place of the coffee bean that the sales of the latter will be confined to the physicians' orders.

Consider how much better it is to nourish brains than to stimulate and thereby weaken them.

Cold drink should never be taken with meals; nor within half an hour before nor in less than an hour after eating. The gastric juice ceases to flow when the temperature of the stomach is below 98 degrees Fahrenheit. This has been demonstrated in stomachs laid bare by a wound.

Milk may be drunk by some people with great benefit, but it is food, therefore the best method of taking it is in the form of "bread and milk;" for the saliva needs to mix with it before it enters the stomach.

QUANTITY OF DRINK.

According to the latest and most satisfactory experiments made in Germany and elsewhere, it is very evident that but few people drink as great a quantity of water as the body requires.

A few years ago a theory was started that it was not best to drink during meals, because the water would dilute the gastric juice, rendering it too weak for digestive purposes. The stomach takes care of that matter. If there is more water in the stomach than its functions require, it at once disposes of it. The danger and harm that comes from drinking at

meal-times, is caused by improper kinds or improper temperature of drink. The exact temperature that nature requires the drink to be is 98 degrees Fahrenheit. Few persons take it at that temperature because it tastes insipid to them. Some, even declare they cannot retain warm water upon the stomach. This but proves that they have abused their stomachs and rendered them morbid. The milk provided by nature for the nourishment of the infant is at exactly the prescribed temperature. As an immediate tonic, or for any other medicinal purpose, water may be administered as hot as the mouth can bear it, but as a beverage, 98 degrees is the only temperature which exactly meets nature's requirements.

USES OF MEDICINE.

We have little to say under this head, but leave it to each person's family physician to prescribe according to the needs of his patient.

The word that is most needed is that which will prevent a person from taking medicine when it is not called for by symptoms of disease.

One theory in regard to medicine is clearly established, and that is that a medicine that will help the sick will injure the well.

TOBACCO.

The use of tobacco is one of the crying evils of our time. The design of this work will not allow space for a proper consideration of the subject; therefore I earnestly pray every reader to peruse "The Tobacco Problem," by Meta Lander. It is a book that should be in every young man's hands. There is no more appropriate gift for birthday or Christmas. Whoever helps others to read the book will perform an act of real missionary work.

HEALTHY ATTITUDES OF THE MIND.

Different states of mind affect the health of the body so much that a few words under this head may be helpful in obtaining and maintaining a high degree of health. Some persons inherit such a strong tendency towards health that they almost seem to be predestined to live healthfully through a long life.

With a large number of persons the opposite is true, and health with them is the result of constant and even heroic endeavor. The first healthy attitude of the mind that I will mention is an *heroic resolve to be well.* This state of mind, if habitual, reacts powerfully upon the body, securing the first requisite of

health. For illustration we have the case of the young soldier, who, after being severely wounded, was told in reply to the questions he asked concerning his chances for recovery, that he had about one chance in a hundred. He quickly answered "I will take that one." The fact that he felt, without question, that he could take which of the one hundred chances he chose, and that it was *choice* on *his* part and not accident, that was furnished him, made the surgeon feel sure of the young man's recovery, although the symptoms were ninety-nine against to one for him. The man recovered speedily. But how would it have been had he stopped to balance in his mind the odds against him. Any experienced physician would say that a different mental attitude on the part of the young man would have made death almost certain.

What the mind contemplates affects the health of the body materially. Some are always thinking of health in all its many splendid manifestations. Such will stand a much better chance of keeping well, or, if sick, their opportunity for recovery will be vastly greater.

There are mothers who take a very unwise course in this regard, and keep an unhealthy mental atmosphere in their homes continually by always holding

the thought of sickness before the minds of their children.

The power of a mental concept to realize itself in the physical conditions is very great. I have seen individuals get well when there was no apparent cause for their recovery except a right mental attitude. There are certain mental states which produce health and others that produce disease.

Habitual cheerfulness is the friend of physical health, while its opposite is fruitful of disease. Prof. Carpenter, in his great work on physiology, says, "A cheerful state of feeling seems to be decidedly favorable to the performance of the digestive functions; it probably exerts a beneficial influence as to both quantity and quality on the secretion of the gastric fluid."

An habitual state of trust acts favorably upon the health of the body. The effect of this affirmative quality on the health is not as apparent as is the effect of its opposite Carpenter again says, "It is a prevalent and perhaps not an ill-founded opinion that melancholy and jealousy have a tendency to increase the quantity and vitiate the quality of the *biliary* fluid. But it is certain that the indulgence of these feelings produces a decidedly morbific effect by disordering the digestive processes, and thus reacts upon the nervous

system by impairing its healthy nutrition." The effects of particular states of mind upon the body are so marked and so great as to attract the attention and thoughtful investigation of the greatest physiologists and writers on pathology and therapeutics.

It is but logical to believe that great cures may be wrought through certain states of the mind. No one disputes that disease and death have been produced by an effect of the mind upon the body. This is such an interesting subject that I shall be pardoned for quoting at some length, from some of the most learned authorities on this subject.

William B. Carpenter, M. D., F. R. S., F. G. S., says, "Although there can be no doubt that the *habitual* state of emotionable sensibility has an important influence upon the general activity and perfection of the nutritive processes, — as is shown by the well-nourished appearance usually exhibited by those who are free from mental anxiety as well as bodily ailment, contrasted with the 'lean and hungry look' of those who are a prey to continual disquietude,— yet it is not often we have the opportunity of observing a production of the change in nutrition of any specific part, by strong emotional excitement."

The celebrated physician Carter, in his memoir on "Hypnotic Therapeutics," reports the following case:

"A lady who was watching her child at play saw a heavy window sash fall upon its hand, cutting off three of its fingers; and she was so much overcome by fright and distress, as to be unable to render it any assistance. A surgeon was speedily obtained, who, having dressed the wounds, turned himself to the mother, whom he found seated, moaning and complaining of pain in her hand. On examination, three fingers, corresponding to those injured in the child were found to be swollen and inflamed; they had ailed nothing prior to the accident. In four and twenty hours incisions were made into them, and pus was evacuated; sloughs were afterwards discharged and the wounds ultimately healed." Dr. Carpenter declares that he has personally verified this statement. Speaking of the power the state of the mind called expectancy has over the body Dr. Carpenter says, "It is to such a state that we may attribute most if not all the cures which have been worked through what is properly termed the imagination. The cures are real facts however they may be explained."

A word of caution may not be amiss here. While wonderful things have sometimes been done through some special action of the mind it is not wise or sound to run into some extreme theory on this subject and discard learned physicians.

What certain states of mind may be able to accomplish in perpetuating health and restoring those who are ill is beyond the comprehension of the understanding, and possibly beyond the power of belief. Upon reliable testimony, it is affirmed that every one of the most fatal diseases have, one time and another yielded to the power of special mental concepts and emotions.

It is reasonable to believe that the time will come when the relationship of psychology and physiology will be so well understood that healing the body through the influence of the mind that is within it, will become one of the mightiest agencies for banishing disease known to the medical profession. Not that it will take the place of all known remedial methods, but will have its recognized place among them. It is now one of the principles of the healing art that is discussed in the medical colleges, and without doubt it will become a subject of increasing interest.

"There is no great and no small
To the soul that maketh all:
And where it cometh, all things are,
And it cometh everywhere."